JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES—GAS, &c.

The Gas Companies' Protection Association and the Sulphur Clauses.

THE Annual General Meeting of the Gas Companies' Protection Association was held too late last week for a comment to accompany the report of the proceedings, which have a special interest in connection with the effort now being made to get rid of the last traces of a legislation which abundant experience has proved to have been both unnecessary and positively mischievous.

Before, however, saying more upon this subject, it may be desirable to call attention to one or two matters referred to in the report that was presented to, and discussed at, the meeting. In pursuance of the objects for which the Association was formed, the Committee report that during the year they directed the attention of various Gas Companies to proposed legislation affecting their interests, and also closely watched the proceedings of Parliament on behalf of Gas Companies generally. Several Bills, it is stated, which, in one way or another, affected Gas Companies, were introduced; but none of them passed into law. The particulars of these Bills are not given, nor does it appear to what extent their failure to pass was due to action on the part of the Committee. From the smallness of their funds, it is clear that they are not in any fighting trim; while the fact that their subscribers represent scarcely one-tenth of the Gas Companies within the United Kingdom, makes it also evident that the brunt of defence has to be borne by those Companies who respond most readily to their warnings. They occupy the position of a chained-up watch-dog, which can and does bark, but is powerless to bite. But a good watch-dog may be of inestimable service; and so may this Association prove to be, so long as it continues to be vigilantly administered. Whether, however, its functions should end here, is a matter with respect to which there is room for difference of opinion. It may be argued, with some show of reason, that an Association of this kind, in order to be really effective, requires to be provided with weapons of defence. In other words, it ought to have a war-chest, so that it may make its voice heard with effect on any question affecting generally the interests which it represents.

The Railway Sidings inquiry may be regarded as a case in point. Although not so stated in the report, it would appear, from the remarks of the Chairman, that the Association called the attention of the Companies in the first instance to this inquiry; but why this was not followed up by further action does not appear. It is evident that considerable weight would have attached to any representations at the inquiry emanating from such an Association. On the other hand, the Institution of Gas Engineers, by the action which they took as representing the entire gas industry, assisted materially in bringing about the satisfactory result referred to by Mr. H. E. Jones. It would hardly be correct to say that there was any actual clashing between these two representative bodies; but it might be of interest to know to what extent the successful opposition of the Gas Companies was promoted by the Association. We ourselves have been under the impression that it was prompted by the objectionable character of the regulations as originally drafted, copies of which were distributed by the Home Office among all concerned.

But be this as it may, it must be admitted that the Association is practically powerless for good in such matters if inadequately supplied with funds, in which view the subscriptions should be increased, instead of being reduced as appears to be desired in some quarters. We are in entire agreement with Sir George Livesey's remarks upon this subject. We can have no patience with the managers of a Gas Company making as much as 44 million cubic feet per annum, who can so degrade themselves as to grumble at a paltry subscription of two guineas per annum for such an object as that for which the Association exists. They do not know their business; and the sooner they give place to others with a higher sense of responsibility, the better for the gas industry. Nor does it appear that any good would result from lowering the subscription with the idea of inducing small Companies to join the Association, membership of which ought to be worth, at the very least, two guineas to almost the smallest Company. There is a great deal also in the objection that the little Companies give the most trouble, because they are always wanting to get law cheap. There is a part of the world, which shall be nameless, where enterprising journalists advertise the gratuitous services of lawyers and doctors on their enemies. Things have not come to such a pass in this country; and, for the sake of these two honourable professions of law and medicine, it is to be hoped they never will. It is bad enough to find law valued so little as hardly to be worth a two-guinea subscription.

The Association have hardly ever done a greater service to Gas Companies, and through them to the gas industry generally, than by the part which they took last year in initiating the promotion of the Bill—now happily passed into law—for the repeal of sulphur restrictions. The success of that measure, in the teeth of the most strenuous opposition offered by Newcastle-on-Tyne, must be a source of unqualified satisfaction to all concerned; and the small cost to each Company at which it was achieved accentuates this satisfaction, while at the same time it exemplifies the value of co-operation. The only matter for regret is that the whole of the Companies labouring under these restrictions did not avail themselves of the opportunity afforded them, instead of the fourteen who now enjoy liberty in this respect. Those who remain under these restrictions have been invited to promote a Joint Bill in the ensuing session of Parliament for securing the much-to-be-desired relief; but it is greatly to be regretted that up to the present only four have signified their desire to do so. That the Chairman of any Gas Company should be afraid of an expense of £50 or £60 for such an object, would be beyond belief, were it not vouched for by Sir George Livesey, to whom such an attitude must be repugnant to the last degree. He has worked as no one else has done, to liberate not his own Company only, but the gas industry generally, from these unnecessary and hurtful restrictions; and to be told that this is not worth the expenditure of a few pounds is an extremely poor return for this devotion and self-sacrifice. It is, however, greatly to be hoped that not only this particular Chairman, but also the Chairmen and Directors of all the other Companies who have not yet given in their adhesion, will, if only at the last moment, participate in the proposed Bill. It will be the final opportunity under the auspices of the Gas Companies' Protection Association.

Supporting Technical Research by the Gas Industry.

THERE was a little comment in the "JOURNAL" last week on the miserable response so far made by the gas industry to the Special Purposes Fund of the Institution of Gas Engineers—a fund having for its object research that shall be of benefit to the entire gas industry. The comment concluded with a couple of suggestions—the one intending to permanently supplement the funds of the Institution by bringing those who hold the purse-strings of the industry into closer contact with its technical side; the other was submitted as a temporary expedient for augmenting the General Purposes Fund. In a spirited letter in our "Correspondence" columns to-day, Sir George Livesey lays hold of the latter suggestion; and respectfully we say that he has, contrary to his usual sagacity in these matters, been judging the picture by looking at the back

instead of the front. At the back, he fancies he descries, or he infers that there is, in the suggestion as to the publishing of the list of subscribers, in effect a black-listing of those who have not subscribed. On the front of the picture a week ago, we saw, and it is still there, the force of example—a force the effective power of which Sir George will be the last to deny. He has published another picture; and what will be the effect of the force of his example? It will assuredly be the deterring of a number of gas undertakings from subscribing to the General Purposes Fund of the Institution. We undertake to say that, before this publication of Sir George's letter, there was hardly an administrator of a gas undertaking outside London who had formulated any tangible excuse for not subscribing; and many there are who will accept—gladly accept—Sir George's reason for not doing so as their own excuse, so little do many of them care about technical advance so long as dividends and profits are good. Sir George believes that gas companies and committees of corporation gas-works are willing (we are pleased that he qualifies this with "or some of them at any "rate") to subscribe to useful objects; and he cites two instances—the Gas Exhibition of 1882 and the Welsbach lawsuits—in which he has appealed for money, and not in vain. In soliciting subscriptions for any purpose, the personal factor is an invaluable aid in producing a good, or marring the, result. In such a matter, we would rather our correspondent be for than against us.

Glancing back at the genesis of this Special Purposes Fund, it had its beginning in a letter by Mr. Charles Carpenter, the Chief Engineer of the South Metropolitan Gas Company. "I make the suggestion," wrote Mr. Carpenter to the Secretary of the Institution, "that the hygienic effect "of gas lighting is one which should be properly thrashed "out by a scientific and medical committee, working in con- "junction with the members of *your Council, who are, it ap-* "*pears to me, the proper authority to take it up.*" Sir George in his letter to-day says that the South Metropolitan and the South Suburban Gas Companies did not subscribe to the fund because nothing really definite was put forth as the object towards which the subscriptions were to be devoted; and he "doubts whether *the Council is the body to* "*undertake useful work in the direction indicated.*" Here we have divided counsel. Sir George apparently mistrusts the competence of the Council of the Institution to direct to useful work; Mr. Carpenter does not. Who shall decide between them? The Israelites groaned when they were expected to make bricks without straw. The Council of the Institution cannot undertake and direct work—even into the hygienic effect of gas lighting—without money; and Sir George would refuse them even a trial, because nothing definite was put forth as to the object for which subscriptions were required. Nothing definite! We thought everybody concerned knew the objects of the fund. One definite object is that suggested by Mr. Carpenter; others can be gathered from the report on the then proposed investigation fund by Mr. James W. Helps, presented at the 1905 meeting. And the members of the Institution—the chief officials of gas undertakings—would not, if required, be slow in furnishing a long list of useful matters for research. We are not at all surprised at the Council—with the warning of the stunted naphthalene investigation of the Southern Association before them—hesitating to select a subject for immediate investigation on a fund of about £580! A subject cannot well be chosen until the total amount of money that will be available is known. Supply the opportunity by giving the Council a proper banking account from which to work, and then refuse to replenish it if nothing useful is done. This seems to be a more rational way of deciding the useful capacity than attempting to settle it by the insecure test of personal opinion. Perhaps, however, the Council will further try Sir George, by selecting a definite subject, and then inviting subscriptions from the Southern Companies.

We have now a representative organization trying to spread its work and influence; and this can be best done by gradual steps. We remember well Sir George using these words at the old Institution meeting in 1902—

> What we want is such a body as shall speak with authority. . . . Why should not one body represent the whole gas industry, having as part of its duty the watching of the interests in Parliament as elsewhere? I do not like to refer to it; but there is that other little matter in which I have been engaged recently in regard to the Welsbach Company. Why should we not have an Association that could have taken up that Welsbach matter, and brought it to a successful conclusion? As it is, it is just left to chance.

There is one Institution now—a body of great potentiality, with one deficiency, and that deficiency money. At almost the first step outwards, Sir George says: "I doubt whether "you are the body to undertake useful work in the direction "indicated." As a technical body, in which direction are they to go? Why, too, should the technical research of the industry be "left to chance"?

As to the suggestion at the end of Sir George's letter, it need hardly be said that it has our complete approbation, in view of prior commendation in these columns of material support by the gas industry to the new department of the University of Leeds, with the accomplished Professor Bone at its head, for the exposition and elucidation of the problems associated with fuels, and particularly in their relation to the gas industry. As Professor Bone has said, no University has before concerned itself closely with the gas engineer's profession; and Leeds University—largely through the instrumentality of Professor Smithells, who is a warm friend of the industry—has been the first to lift the industry's work to the level of the arts and sciences taught and studied at our premier seats of learning. Sir George is modest in his suggestion that the gas industry should raise £500 a year for the support of the new professorship at Leeds. But with the spirit of the suggestion we are in hearty accord, and shall be glad to forward any such movement to the full extent of our power. At the same time, the gas industry is not in such a penurious condition that a subscription of £500 to the University of Leeds ought to exhaust the power of subsidizing technical research. It was pointed out last week that 6d. per million cubic feet of output of the authorized undertakings of the United Kingdom would represent an income of £4216 per annum, which leaves a big balance after providing the £500. Most cordially can we support this suggestion; but it must be submitted, with due deference, that the inference and argument contained in the first part of Sir George's letter need a little revision.

For Economy.

At length the ratepayers of London and the Provinces—especially of London—have bestirred themselves, and have declared that they are the masters of their representatives by giving them the stern rebuke of dismissal, and appointing as successors votaries of efficiency and economy. In the Metropolis, it has been a great revolt; and there has been an almost clean sweep, which, if it does not break the spirit of the remaining would-be prodigals, will render them effectually harmless. Extraordinarily heavy rates, produced by many abuses and superfluities, have done their work. The pocket has been dipped into far too deeply; rates have oppressed industry, trade, and the private resident; and the house owner has found the value of his property fast diminishing, income declining, and expenses ascending. The causes of such big claims for local government have been inquired into; and the extremists, the incompetents, and the arrogant dictators of local policy have been brought to book. The true meaning of progressivism and socialism has been found; and the patient packhorses of the costs of local waste have had enough of it. They have now put into power men who are pledged to reform and economy; men whose work will be directed to attempt to gradually unload some of the superabundance of expenditure—anyway, they will assure that there is no increase. Their task is not an enviable one; but it will not be a thankless one if success follows endeavour. There is such a mass of muddle, however, for them to attack, that the process of reform must needs be slow.

With an exception or two, in those boroughs where there are municipal electric lighting undertakings—specimens of gross mismanagement and deceptive practices—where the cost of street lighting has been mounting up by thousands of pounds per annum, and in connection with which the traditional rule of economy with efficiency has been, without the slightest compunction, tumbled into obscurity, the Municipal Reformers have been put into power. And now gas may at any rate look for, in the public lighting line of competition, a fair field and no favour. Even in Battersea, the Municipal Reformers have got almost on a level with the Progressives. In Bermondsey, the birthplace of the Bermondsey clause which has been evaded by an excessive price for public electric lighting, the Moderates have put the Progressive representation in a minority. In Camberwell, where the Progressives have been talking of ousting cheap gas lighting by bringing in a municipal supply of electricity,

the ratepayers, practically on this question alone, have put into power 44 Moderates with only 4 Progressives in opposition. In Southwark, where the Progressives refused the publication of certain figures respecting the electricity undertaking and public lighting, the Moderates have now the upper hand. From the other boroughs where the electricity undertakings have produced burdens, through deficiencies and through excessive expenditure on public electric lighting, comes the same tale. The Moderate boroughs in the Metropolis now number twenty-five against two Progressive (Stoke Newington is worked on non-party lines), whereas previously the Progressive boroughs were in the majority.

If the London County Council scheme of electricity supply goes through, it is now certain that several of the Borough Councils will take the earliest possible opportunity of unburthening themselves of their electric light undertakings. But there is rather less certainty now as to the fate of that scheme. The shock given by the borough elections has been tremendous. Already the Progressive majority on the County Council—who are head and front in visionary and profitless venture for the Metropolis—are trembling at "the "handwriting on the wall," and are looking forward distrustfully and disconsolately to the result of the County Council elections next March, when there will be still time for a Moderate majority to abandon the multi-millioned electricity project. The ratepayers must keep themselves braced up for the fray, so as not to surrender in March any of the advantage now gained; for from Spring Gardens a ghastly amount of mischief can be, and is, wrought without asking for the "yea" or "nay" of the ratepayers. In the boroughs, the *débâcle* has exceeded the expectations of the most sanguine. It is fervently hoped that the result of the County Council elections in March will supply a parallel. At all events, there will be a great drawing in of horns now that the ratepayers have exerted themselves to good purpose.

Side-Lights on Co-Partnership.

In the wake of all great schemes of human endeavour having for their object the amelioration of the lot of those to whom the great difficulty is to get the start for their material improvement, is to be found an amount of flotsam and jetsam which one would fain be quit of, if it were not that among this undesirable accompaniment are found just those who most need the help. Folly and ignorance and uncultured minds are more difficult to deal with, in connection with such schemes, than prudence and intelligence; but where folly can be turned to prudence, ignorance to knowledge, and the distorted mind to refinement, the conquest is great, and so is the satisfaction. The co-partnership schemes of the South Metropolitan and South Suburban Gas Companies have had their flotsam and jetsam; and it has been most difficult to deal with. The experience of the Directors and officials of these Companies has doubtless been that of the Directors and officials of other undertakings that have adopted the system. But as we do not know, it is sufficient to confine attention to the experiences in South London. Much was learnt of these experiences at the Society of Arts last Wednesday, when Sir George Livesey, in the interests of the great principle to which he has so largely devoted himself, told the members of the Labour Co-Partnership Association of the magnificent success that has attended his labours; and he did not make the slightest secret of the troubles caused mostly by the folly and ignorance of nothing more than, relatively to the grand total, a handful of the men. But there is a large-heartedness about this co-partnership business. Though men have wilfully erred in connection with co-partnership, they have not been made derelict without a second chance of conforming to the principles underlying the system, with its reciprocal objects present and future.

Complaint was made by one speaker at the meeting on Wednesday that the men of the South Metropolitan Company were treated as children, and were bound hands and feet by rules. Laws and regulations are made to govern; but they do not touch those whose actions are directed by a conscientious regard for individual responsibility. Such, it is too often lost sight of, walk above the law. The laws and regulations attaching to the co-partnership scheme of the South Metropolitan Company have been made, not for those who venerate the principles they have accepted, but for those irresponsibles who need control to enable them to abide by those principles, and for those who require to be dealt with for violating them. The necessity for them is shown by the difficulties experienced, which difficulties have had to be legislated for to prevent recurrence. It must be remembered that co-partnership as practised in the gas industry south of London and elsewhere has definite motives and objects; and it must be remembered also what those motives and objects are. Most of the transgression that has arisen has had the one purpose of getting hold of the money represented by the stock possessed in the Companies. To sell stock certificates to publicans, and to pawn certificates —while the men *de jure* have the right to do this if they so desire—is to violate the principles which they, in common with their fellows, have adopted; and therefore, *de facto*, they forfeit their right to further participation in the scheme for mutual advantage. The selling of stock to publicans and the pawning of certificates are representative of the difficulties brought about by the folly and ignorance of the few; but because certain men years ago sold to publicans, because 130 men have pawned certificates—because there is this handful of apostates, who may afterwards be taught to see the error of their ways—it does not point to any failure of the scheme. The ranks of beneficiaries from the scheme in the South Metropolitan Company are composed of the balance of (say) between 4000 and 5000 workmen and the whole of the ordinary and gas-consuming proprietors. The workmen of the Company have a stock-holding to a market value of £309,000, in reserve for old age, trouble, or more profitable employment. The results in the case of other Gas Companies will be found in the "Journal" for Oct. 16.

Difficulties have compassed the scheme; but they have been surmounted as they have arisen. But without the guiding hand, the rules, the regulations, there would not to-day have been such a material success; there would not to-day have been so great a number of men who walk above the law and regulation of the system, because they have learnt the value of the principles of co-partnership. They find co-partnership Trade Unionism *par excellence;* they find it ideal. They also find that they have here an inversion of the scriptural truth that "it is more blessed to give "than to receive." They have discovered that it is more blessed, in this instance, to receive than to give to the Trade Union. Though if they choose to do the latter, no one will say them nay.

Incandescent Gas Lighting in the City.

As will be seen from the report which appears in another part of the "Journal," the proceedings at the meeting of the Court of Common Council last Thursday were of unusual interest from our readers' point of view. The Streets Committee presented a return relative to the cost of lighting Queen Victoria Street, Queen Street, Fleet Street, and the area of Billingsgate Market, by high and low pressure incandescent gas; and it showed a saving in the annual lighting bill of £490 10s. 2d., or £119 7s. 10d. more than was estimated. There was also a saving of £194 1s. 4d. in the estimated cost of the installation; this figure being chiefly accounted for by connecting the high-power lamps direct to the high-pressure mains of the Gaslight and Coke Company, and avoiding the necessity for a compressor house and plant. Thus not only has nearly £200 been saved on the first cost of the work, but also a sum of nearly £500 per annum for lighting purposes on these three small experimental areas. By the change in the system, 51 arc lamps, of doubtful lighting value, perched up towards the clouds, have given place to 119 good incandescent gas-lamps, placed low enough to enable the great vehicular and pedestrian traffic of the City to wend its way in safety and comfort, and sufficiently close together to permit them to light the side turnings as well as the main roads. Of the total number, 84 of the lamps are high-pressure. Nothing but praise at the result of the experiment was expressed by the various councillors. After the report had been adopted, the Council proceeded to consider three recommendations submitted by the Committee in regard to the removal of certain electric light lamps, and the substitution of incandescent gas-lamps for them. These were small matters, but the discussion upon them assumed the proportions of a full-dress debate. Mr. R. Stapley wished to have them referred back to the Committee for further consideration, so that the City of London Electric Light Company might "have a chance" of showing what they could do in the way of up-to-date electric lighting. In the course of the discussion, it was stated that the Company had reduced their charges for lighting the Central Meat Market by about 30 per

cent. This enabled Mr. A. C. Morton, M.P., who has done so much to improve the lighting of the City, to emphasize the point that no concession would have been made had it not been for the success of the rival illuminant. Of course, he opposed the amendment; and it was eventually lost. It was just as well it was brought forward, as it elicited a speech from Mr. Morton in testimony of incandescent gas lighting, and an assurance from Mr. Domoney that the Streets Committee, of which he is the Chairman, have no feeling, one way or another, in regard to the parties who light the City. Their only desire is to secure the best results at the lowest cost.

A Socialist's View of the Trades Disputes Bill.

At a time when the daily papers are once more largely occupied in chronicling the parliamentary debates on the already much-discussed Trades Disputes Bill, and in commenting on the various aspects of the question from either an employer's or a Trade Unionist's point of view, it is quite refreshing to read in the columns of the "Standard" a lengthy article written by one who signs himself "An Independent Socialist." It would naturally be expected that a man who could justly claim such a title as this would be opposed to class legislation of any kind whatever; and—in this case at least—such proves to be the case. The argument that the Bill is a democratic measure is indignantly thrust aside, as well as the contention that it is for the greatest good of the greatest number; it being pointed out that, in addition to the capitalist, the mass of workers are also outside the benefits which the Bill is intended to confer, for not one working man in seven is a Trade Unionist. But the writer of the article goes still farther than this, for he urges that the Bill is not even conceived in the interests of all Trade Unionists, inasmuch as many only join the Societies from the fear that otherwise they will lose their job; and when the measure in question becomes law, the Union leaders will be able to drive the members in any desired direction more easily than can be done to-day. All this, of course, we know; and there would be no particular need to refer to this Independent Socialist's opinions, were it not for the fact that he follows them up by a suggested solution of the whole matter which is at any rate worthy of being put on record. It is admitted, in the first place, that there is a grievance in the matter of the liability of Trade Union funds for the wrongs done by their agents. A case is quoted in which a Railway Company were found not to be liable for an act of their stationmaster, because in doing what was complained of—a thing that was proved to be outside the company's powers—the stationmaster was not, and could not be, acting in the course of his employment. The author asks why this rule should not apply to Trade Unions. It does, he says, apply theoretically, and it only does not apply in practice because it has not yet been determined what are the functions of a Trade Union official. No Judge or Jury knows whether a Trade Union agent when he does a certain thing is or is not acting within the scope of his employment, because it has not been settled what that scope is. The writer of the article is of opinion that it only remains to delimit the functions of a Trade Union official, and all grievance under the present law will vanish, because, once those functions are properly and clearly defined, Trade Union funds will be immune from liability for any wrongful acts which officials may commit outside the range of their functions. If, he concludes, the Trade Unions can and will draw up a list of the functions of their agents (which, of course, must not be illegal), and embody it in their rules and constitutions, there is not the slightest reason in justice why the law should be altered at all in such an undemocratic and unsocialistic direction as that of creating a privileged class, exempt from the law applicable to the general public.

The Society of British Gas Industries.

Arrangements for the meeting of the Society of British Gas Industries, on Friday, Nov. 23, have now been completed. It will be held at the Holborn Restaurant; and the chair will be taken by the President, Mr. Dugald Clerk, M.Inst.C.E., F.C.S. An address will be given by Mr. Walter W. Thomas, P.P.S.A., on "The Uses to which gas has been, and can be, put with Advantage to the Public and Manufacturers." Later in the evening, there will be a reception, by the President and Council, of the members and friends of the Society, and shortly afterwards dinner will be served in the Caledonian Salon.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 404.)

The Stock Exchange had a much better time last week, although the period was broken by the 1st of November holiday, which always dislocates business when it comes in the middle of the week. Fears regarding monetary developments were gradually dissipated; and progress was made towards a reinstatement of normal conditions. There was some good, steady buying of investment stocks, which was only temporarily checked by realizations in view of the closure on Thursday; and the gilt-edged division profited accordingly. Incidentally, the result of the municipal elections had a share in imparting firmness. Another favourable factor was the more promising aspect of affairs in Russia. So, taken all round, things were decidedly better, and were, perhaps, at their best at the close. In the Money Market, the demand became strong as the end of the month approached; but when that was passed, the stiffness relaxed materially. Apprehension had been entertained by some that the Bank Rate would rise on Thursday; and just as this fear while rife helped to tighten the situation, so its subsequent dissipation contributed to actual ease. Business in the Gas Market was only moderately active on the whole. It opened quietly; then developed increased pressure; and then fell back again towards the close. But the temporary flatness which had affected the market the previous week was now quite removed, and the tendency was generally favourable; while some important issues advanced quotations. In Gaslight and Coke, the ordinary was below the normal in point of activity, but was in good favour, and the quotation advanced a point. Dealings opened with a bargain at 96¾; but this price was soon left behind, and on Wednesday a parcel changed hands at 99. Not much was done in the secured issues. The maximum realized 88½ and 89; the preference was done once at 107½; and the debenture fetched 84½ and 85. South Metropolitan was rather brisk, and advanced a point. A small amount was done free at 129; and the best price was 131 on Friday. Commercials were little dealt in. The 4 per cent. changed hands at 111 and 111½; the 3½ per cent. at 108½ and 109¾; and the debenture at 84. The Suburban and Provincial group was quiet as usual. Brentford new marked 198½ special and 201½—probably on re-sale; British, 41½; South Suburban debenture, 129; Tottenham "A," 129 and 129½; Wandsworth and Putney "B," 140—followed by a rise of 1; and West Ham preference, 122. In the local Exchange, Liverpool debenture improved 2. The Continental Companies were quieter. Imperial marked from 186 to 187¼; Union, 124 and 125—a rise of 2; and European from 24⅞ to 24¾. Tuscan was done at 10½ and 10⅝. Among the undertakings of the remoter world, Primitiva ordinary changed hands at 7¾ and 7 15/16; ditto preference at 5 7/16 and 5¼; ditto debenture at 97 and 97⅛; River Plate at from 12½ to 12 1/16; ditto debenture at from 96½ to 97⅛; Monte Video at 12¼; San Paulo at 13⅜; Cape Town at 14¼; Melbourne 5 per cent. at 101⅝; ditto 4½ per cent. at 100¾; and Oriental at 153½.

The closing prices are shown in our Stock and Share List on page 404.

ELECTRIC LIGHTING MEMORANDA.

A Portentous Scheme by the London County Council for Controlling the Electricity Supply of London—Mammoth Capital Expenditure—The Requirements of the L.G.B. respecting Loans—Considerations affecting Heating and Cooking by Electricity.

The Select Committee of the House of Commons who considered the London County Council's Electricity Bill a few months ago, came (by the application of a little gentle inducement by the Board of Trade) to the conclusion that the scheme then submitted to them was defective in respect of comprehensiveness. It was thought by people having the best interests of London at heart, that the scheme was sufficiently big and extravagant to do a great deal of damage; but in the wisdom or otherwise of the ultraists now trying to dominate imperial and other affairs westwards, it was adjudged inadequate, incomplete, and incomprehensive. It was something new for the London County Council to be told that they had not gone far enough; and the sensations of the Progressives and Socialists on the Council, it may be imagined, were of a peculiar kind. Such a fault—if fault it be—is not going to be brought to their charge in the coming session; for the Highways Committee of the Council have adumbrated a scheme which will permit an outlay of an, at present, incalculable number of millions, and over which spending can be carried on *ad infinitum*. There shall be no more jeering over incomprehensiveness; but extent and unwieldiness do not, of course, necessarily mean completeness. If the Gas Companies of London and the suburbs can shut their eyes to the fact that they are ratepayers, and look at the new-born scheme from a competitor's standpoint, their most pious hope will be that it will be carried out in its entirety, and under the management of the County Council. It will be a big and ungainly competing concern, with every movement trammelled; and consequently as a fighting force it will be no match against the mobility of its gas competitors. The whole generating work of the undertakings it is intended to centralize to an extent dangerous to reliability of supply. People

will not like the look of the doubtful principle of placing "all one's eggs in one basket" as proposed here.

Let us run quite lightly over the details of the scheme which the County Council will, we believe, be discussing to-day. The Highways Committee propose that the Council shall extend its beneficent cables over some 451 square miles of territory. Of this, the not insignificant portion of 334 square miles is situated outside the County of London; and deficiencies from this large proportion of the area will come upon the ratepayers within the jurisdiction of the Council. A generating station at Barking or at Erith—the Greenwich Observatory is evidently to be spared further tremors and other forms of distress—is proposed, over which a trifling £1,400,000 is intended to be spent by way of a start. Trunk and distribution cables, and switch-centres are computed at £2,650,000. Then it is suggested that provision should be made for the purchase of motors and other apparatus for hire to power consumers—representing another trifle of £2,650,000. Such provision appears to be absolutely necessary if an electricity power supply concern intends to induce manufacturers to be off with the old love and on with the new. However, to this point there is an expenditure of 7 millions, all but £300,000, involved. But this little sum of £300,000 may be thrown in to cover incidentals, when millions are being bandied about in this way.

Then a great change has come over the ideas of the Highways Committee. A few months ago the Committee and the Council were all for power and bulk supply. But they appear now to think that the present electricity undertakings have a nasty, bristling look about them, which suggest potential forces in bringing about failure; and if they continue unattached, then they may prejudice the main object of the Council's scheme, "which is the supply of electricity for power." There is simplicity of statement here which covers a quantity of meaning. The existing undertakings must therefore be got out of the way, or else tied to the County Council in some manner to be defined later on. A start is proposed by getting powers to compulsorily acquire fourteen out of the sixteen municipal undertakings in London—leaving out the 2 million capital-bearing undertaking of Marylebone and the Woolwich concern. The alternative to acquisition is a working agreement. But if they can get their money back, there are Borough Councils—especially now that the Municipal Reformers have routed the Progressives—who will be only too glad to wash their hands for all eternity of their electricity undertakings. The County Council may therefore become the suppliers of electricity in London not only for power, but also for lighting; and we can imagine that there will be a large throttling of the lighting business for the sake of the power—that is to say, if the power business does not pay at the prices charged, the lighting consumers will find themselves the sufferers, so long as they remain electricity consumers. But there can always be a reversion to gas, with the economical incandescent burner and mantle. Beyond this compulsory purchase of the municipal undertakings, it is proposed that the Council should take powers to compulsorily purchase the Electricity Companies' undertakings in 1931, or earlier by agreement.

The County Council are, therefore, without any shadow of doubt, setting sail for supremacy in electricity supply in London; and if they get this, then will surely follow the project of the fevered brain of the Progressives to make out of the County Council a Parliament for London and a large district around, and give the happy dispatch to all other governing authorities in the area. Supremacy is the policy of the visionaries of Spring Gardens. When the condition of things comes about that the Progressives are projecting, London will be an undesirable place in which to reside. But we have seen a prospective capital expenditure above of about 7 millions; the capital expended on the local authority undertakings totals £5,450,000, and upon the Company undertakings £12,718,534. And we all know the disposition of electricity estimates for expanding. It will have been observed that, apart from purchases of undertakings, the greatest calculated expenditure on new works and apparatus is in the distribution system and for motors and apparatus. In regard to the former, it must not be forgotten that, through the tremendous increase in the value of copper, the cost of electrical distribution work has enormously increased; and if the Council were to depend upon power custom only, there would be long lengths of cable bringing in little revenue. Concerning motors, there is evidence as to their rapid depreciation; and an Insurance Company, as noted recently in the "Memoranda," has let light upon the frequency of their breakdown. The rapid depreciation will have to be provided for; and this will make the hiring-rent heavy. Manufacturers will be disposed to count the total cost before making a change. Altogether the distribution costs connected with this scheme will be enormous. Another point is—and this is a change from the last promotion—supply is to be obligatory and not permissive. Stubborn opposition will be offered to the measure; and it will be strange indeed if the ratepayers are not moved to agitation against it. They will have a fine opportunity next March; but meantime they must not be led by the prophets into any feeling of sweet optimism over the scheme.

After the blessing that the Right Hon. John Burns gave to the Brighton electricity undertaking recently, a letter from the Local Government Board, dealing with the muddled finance of the department, no doubt came as a surprise to the Corporation. There was an inquiry, it will be remembered, into an application for a loan of £38,500, at which inquiry, officials, books, and, in fact everybody and all the records, were up in the clouds respecting the finances of the department. The Inspector (Mr. H. Ross Hooper) was indefatigable in trying to unravel the tangled skein; but, with all his perseverance and cuteness in these matters, he must have been dissatisfied with the result. The communication which Brighton has received will, or ought to, have, a monitory effect on other local authorities owning electricity undertakings. The Council have been pooling their loans, and drawing from the total without discrimination as to the purposes for which the money is to be used. There are thus no means of showing whether the moneys have been spent for their rightful purposes; and therefore the specified varying periods allowed for the repayment of money employed for particular objects may be transgressed to an indefinite degree. The Board are going to have no more of this; and they have demanded from the Council, before sanctioning some £24,043 of the amount last asked for, an undertaking (by formal resolution) that separate accounts shall be kept of the expenditure of all future loans, and that the loans shall be expended only for the particular purposes for which they are sanctioned. The Board further intimate that they will require to be furnished with detailed statements of the expenditure out of these loans when the money has been spent. Also in the event of sanction being required to any loan for defraying excess expenditure on works for which loans have been or may be sanctioned, the Board will in future require to be furnished with full information showing how the excess has arisen. The last paragraph of the Board's letter is a significant one, and it has aroused keen resentment in certain electrical quarters. "The Board," says the Assistant Secretary, "direct me to add that they understand from their Inspector that the question of the comparative cost and efficiency of lighting streets by gas and electricity has never been considered by the Town Council." There is plenty in his short, pointed letter for local authorities to digest, and by which to shape future action. Regarding the keeping of proper loan accounts, something of a similar nature to the foregoing has found its way from Whitehall to Portsmouth. Some of the councillors are very angry about it, as this choice phrase by one of them will sufficiently indicate: "The Nation is inspector ridden; and the British public are serfs under the permanent officialism of the Local Government Department."

Electric cooking and heating are still very much in the air; and to the truth of this the "Electrician" bears witness in a recent issue. When the Electricity Exhibition was in full swing at Olympia, it was shouted from the housetops that a good time was coming, when the gas-tap would be replaced by the electric switch, and householders would turn their patronage over to the more expensive and hardly yet practical systems of doing the same things by electricity, so as to save themselves and their families from being poisoned as they had never been poisoned before, and so as to save themselves the torment of being reminded that it was time, in the cause of cleanliness, that their gas-stoves were swabbed out. The world has wagged on for twelve months since those stirring times, and the world seems to be doing very well still without electrical cookers and with a very modest adoption of those icy-looking electric radiators, whose very appearance makes one really shiver on a cold day. The public in this matter likes something that not only feels warm but looks warm; and the nearest approach to the much esteemed—if wasteful, inconvenient, and dusty—coal-fire is the gas-fire with ball fuel. But a year ago, electrical undertakings misled by the noise made at Olympia, one after the other announced electrical energy on sale for heating and cooking at 1d. per unit, without thinking very much about what they were doing. The object of the reduction was to stimulate business in these directions. But the penny has not been strong enough to exert any noticeable influence. Even at 1d. per unit, if there were no other considerations, cooking and heating by this means would be dear. But there are other considerations; and the "Electrician" may be drawn upon to supply them. Here are samples: "If the low price of energy is to be taken advantage of, the householder must have a separate meter, the rent of which is equivalent to quite a number of units; and he must run separate circuits. On the other hand, if a separate circuit is not used, he must modify his existing wiring to some extent; and if he trusts to a maximum demand system, he may suffer by the maximum being raised considerably by the heating and cooking, so that the cost is much increased. Not only so, but the apparatus is somewhat expensive . . . and the renewal may be an unknown quantity—the cook being a factor in the case." Then there is the hot water question, the question of reliability, the question of time spent in cooking, or in warming an apartment, the question of economy, the question of——perhaps this is enough, with the quotation from the "Electrician," to show that electrical cooking and heating are not particularly close friends of practicability.

We regret to learn that Mr. William Young is lying seriously ill at his country residence, "Harehope," in the neighbourhood of Peebles.

At the Bromley Congregational Chapel, on the 23rd ult., the marriage was solemnized, by the Rev. T. H. Darlow, of Harold, the only son of Mr. J. Margetson, of "Merevale," Bickley, with Ethel, the youngest daughter of Mr. Corbet Woodall.

THE TECHNICAL LITERATURE ON VERTICAL GAS-RETORTS.

In the "JOURNAL" for the 25th of September last (p. 823), we gave, under the above title, a classified bibliography of articles which had appeared in our pages on the subject of "Vertical Retorts." We have since found that some items which appeared during the year 1904, relating principally to the Settle-Padfield system, should have been included; and we therefore reprint the list with a few other additions which bring it up to date.

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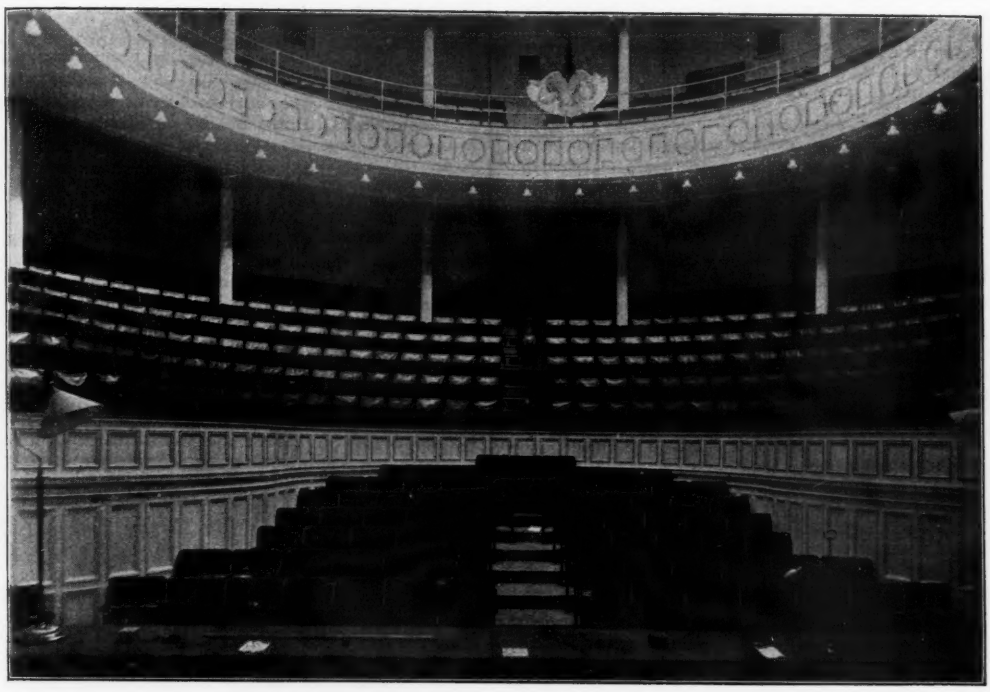
NEXT YEAR'S MEETING IN DUBLIN OF THE INSTITUTION OF GAS ENGINEERS.



The Meeting Place of the Institution in Dublin Next Year.

The President (Mr. Charles Hunt, M.Inst.C.E.) and the Council of the Institution of Gas Engineers have taken time by the forelock in the making of their arrangements for the visit of the members to Dublin for their annual meeting next year. The Irish International Exhibition and the meeting will, our readers are aware, have an intimate relationship. At the last meeting of the Council of the Institution, it was decided that the meetings for the business and technical work should be held in the theatre of the Royal Dublin Society, Leinster House. A photograph of the interior of the theatre is reproduced. It is well situated for the meeting—being in a central position, and within easy reach of the chief hotels. Certainly, the view suggests most comfortable accommodation.

In last week's issue, it was mentioned that, in view of the special character of the meeting next year, the President had invited the Société Technique du Gaz en France to contribute to the proceedings. We learn that the American Gaslight Association have been similarly invited to be represented; and it has been suggested that suitable subject-matter for a contribution from the States would be "High-Pressure Gas Distribution." In view of the exceedingly interesting communication from a member of the German Association (Herr E. Körting) at the meeting of the Institution last June, the President and Council have not sought another contribution for the next meeting. May we suggest, however, that should the subject of vertical retorts be on the *agenda* for next meeting. that the talented author of last year's paper should be invited to attend. It is clearly intended by the Council of the Institution that the international character of the Exhibition shall be extended to the meeting.

THE ADVANTAGES AND THE DIFFICULTIES OF CO-PARTNERSHIP.

Co-partnership, of the particular kind with which we are concerned through its application in the gas industry, has its difficulties as well as its advantages. The difficulties are not many; and they partake the character of fleeting clouds in an otherwise fair sky. Each one that appears bears a different aspect to its predecessors. But, notwithstanding the perplexity and trouble they occasion, they mostly have the merit of ingenuity in their conception, though it is ingenuity exercised in a bad cause. But it can be said that they serve to sustain interest, and arise only to have attention concentrated upon them to effect their suppression, for the good accomplished cannot be allowed to be undone by the machinations of a few men.

Something is learnt about these difficulties through a discussion last Wednesday, opened by Sir George Livesey, at the annual meeting of the Labour Co-partnership Association, in the historic hall of the Society of Arts. The discussion was on labour co-partnership in relation to the social problem. The unique position occupied by Sir George in connection with the planting of the principle of co-partnership in the gas industry realized for him a cordial reception, when he rose to move—"That this meeting recognizing the serious inequalities which abound in the existing social system, affirms its belief in the principle of co-partnership, by which labour and capital are united in a common endeavour to produce and distribute wealth in the most efficient manner, and hopes that both employers and employed will give increasing support to an industrial method so well calculated to solve some of our most acute social problems." This is a comprehensive resolution; and needless to say that, in a meeting composed of those holding dear and practising co-partnership in the several forms adapted to dissimilar branches of industry, the resolution, before the close of the meeting, was accepted to its final letter and to the ultimate extent of its spirit.

The Chairman of the meeting was Mr. Theodore C. Taylor, M.P.; and Sir George quoted a remark that that gentleman made some time ago on a somewhat similar occasion: "This is not philanthropy; it is business up to date." Some men have made attacks upon this remark; but Sir George defended it. The true principle on which business should be conducted is expressed in these words that have existed through the ages, and will be found imperishable: "Whatsoever ye would that men should do unto you, do ye even so to them." Sir George believes that co-partnership complies with that principle. But in considering, now for a great number of years, the present relations of employer and employed, he has come to the conclusion that those relations are most unsatisfactory; and he does not see that they are getting much better. The curatives for labour troubles labelled "Conciliation Boards" and "Arbitration" are not to Sir George's liking. "Conciliation" he defines as a plan in which each side has to give up something to which it is entitled for the sake of peace. And in arbitrations the result is sometimes that one side is satisfied and the other one dissatisfied; but, as a rule, both are dissatisfied. That is not what employer and employed want. They want something which will enable them to pull together, and something that will endure. Passing on, the proposition was advanced that property is not fairly or properly divided in this country; and for this condition of things all are to blame—the working class because of their want of providence in the past, and the richer class because they have not helped the working class to become owners of property.

Quitting his examination of present conditions, and of the patching methods of dealing with labour differences (the efficacy of which methods has brief lasting power), Sir George devoted the remainder of his address to the remedy. There is no dissembling, no ambiguity, to be found in this robust declaration of faith as appertaining to this social problem: "I believe most thoroughly that co-partnership is the remedy for the evils which

we are considering. Co-partnership unites capital and labour; and thus makes the two more productive. Co-partnership also enables the employee to become an owner of property; and by that means it succeeds in doing what no one else has done, and no other system has achieved." "Profit-sharing" is in Sir George's opinion an unfortunate expression. It conveys a wrong impression; and it does not go far enough. It means a certain distribution of profit in cash annually; and in this exponent's experience, it does harm. It does not encourage thrift; it encourages a man to exceed his ordinary income, and to run into debt in anticipation of the profit distribution. There is such a thing, too, as "going on the spree" when the periodical distribution takes place. Few are induced to save the money by thrift propensity, or by such inducements that co-partnership offers; and altogether Sir George proclaims it a discredited system. Co-partnership unifies the positions of employer and employed. It makes them partners in both profit and loss. When one considers the enormous extent of joint-stock enterprise in this country, it is rather dispiriting to find directors doing so little. There is a weakness here; and Sir George, with all his experience and endeavour, has failed to find how to put life into the inanimate, how to stir up an appreciation of responsibility among directors in applying the one effectual dam to the drifting current of rabid Socialism.

We heard again, tersely explained, the system of co-partnership as applied at the South Metropolitan and South Suburban Gas Companies' works. Summing up the system, it is founded on the giving of a certain percentage on salaries and wages, dependent on the price of gas. When the price of gas goes down, the percentage increases; when the price goes up, the percentage diminishes—just as does the shareholders' dividend under the sliding-scale. But it is an essential of the system that all (from the chief officer to the humblest servant) should be included. Sir George told how at the start bonuses were paid in cash. The weakness of this was soon apparent. Then effort was made to prevail on the men to leave the money in the Company's hands. Some 45 per cent. of them did so. After a few years, it was thought that it would be better if the men could be induced to invest their savings in the Company. A few did so. Then came the agreement that half the bonus should be invested in stock; and the other half paid in cash. Peaceful persuasion was again resorted to, to induce the men to leave the whole of the money in the hands of the Company. Now practically the whole of it is left. Of the £43,000 allocated last July for bonus in the case of the South Metropolitan Company (except so far as affected men who had left or died), the half was invested in stock, and the whole of the other half was deposited with the Company, and a good deal of this has been, at the wish of the men, also invested in stock. The same healthy state applies to the South Suburban Company. This, in short, is the evolution of the co-partnership scheme as applied to these Companies; and it is a remarkable evidence of the success of perseverance in a good cause.

One difficulty has been—and it has been, as seen above, a tough task—to induce the men to become thrifty. But the result justifies the expended labour. There is an outstanding essential; and that is that there must be discrimination in the giving of the bonus. It must not be given to good, bad, and indifferent alike. At the start, every man is assumed to be entitled to it. He signs an agreement, and then gets his proportion. But any man who in the course of his work shows carelessness and indifference, and takes no interest in his work, is told, when he applies for a renewal of his agreement, that it will not then be renewed, but if, in three months' time, there is an improvement, he will be allowed to sign again. By this means, discrimination is exercised; and the result is exceedingly satisfactory. The agreements are such that they secure to the men work for twelve months; and they also provide that, if he wishes to improve his position, or desires to leave, he can do so at any time by giving a week's notice, providing that his leaving causes no inconvenience. Co-partnership, of course, aims at permanently benefiting employer and employed alike. If the money is spent, it does not permanently benefit the one or the other. If it is saved and invested in the stock of the Company or in houses, then there is permanent benefit to both. The demeanour of the men, and their attitude towards their employers and officers, are things that one could hardly have anticipated as an effect of the system. Improved self-respect is another influence promoted by the system; and still another is that the men have been inspired with hope. The great material projecting result, however, is that in the South Metropolitan Company the men have about £300,000 invested; and the South Suburban men have an aggregate holding in proportion. Among the main difficulties are these: Men here and there—the prodigals—leave simply and solely for the purpose of getting hold of their money. There are several such cases that have come under Sir George's own notice. Again, some years ago, transfers of stock were put before him for sale to a publican; and occasionally stock was sold or disposed of otherwise unsatisfactorily. The result is a rule that the stock should only be sold through the Company, at the market price, of course. If it is not, the agreement ceases. Another trouble has been the pawning of certificates. Through this, in the case of the South Metropolitan Company, it was determined to call in the certificates, and it was found that, out of about 5000 men, 130 had parted with certificates; but the total amount was not more than 1 per cent. on the stock held by the employees. Sir George went to one of these "loan offices," in connection with this matter. The people there thought they were doing the most benevolent thing possible. Their rate of interest was 33⅓ per cent.! Sufficient said. The men have all of them been helped to recover their positions. Against these perplexities and annoyances, is the remarkable solid investment in the Company, and the general contentment; and illustration was given by Sir George of benefit in individual cases—all of which has led him to the deliberate conclusion that the results of co-partnership are such as to justify him in saying that it is a remedy for the difficulties existing between employers and employed. It must not be forgotten, too, that, in the case of the two Companies named, co-partnership has been made complete by the election of Employee Directors. This step was, at the time, regarded as dangerous by some; but it has worked most satisfactorily.

This review of the extempore address would not be complete without touching lightly on two or three phases of the discussion, which was taken part in by many speakers—mostly sympathetic and applauding, one or two critical—not of co-partnership, but of methods. The veteran Mr. J. M. Ludlow, one of the workers in the Christian Socialistic movement in the middle of last century—who is himself a living illustration of the length of the road along which this great principle of co-partnership has already travelled—expressed his thankfulness at the immense strides so far made. Another illustration of difficulty was presented by Mr. Fairbarn, who, agreeing that co-partnership is the one remedy for "the upheaval of the social state," spoke of a widow of a gas worker in the South Metropolitan Company, who got hold of the money on the death of her husband, and drank it all away. Some criticism came from Mr. G. W. Shaw, who thinks that in the South Metropolitan scheme there is a tendency to treat the men as children. They are, in his view, "cabin'd, cribb'd, confin'd." This not being so in the case of the ordinary shareholders, he cannot see that the treatment of the men is equitable. He has no doubt that this giving of the bonus means more efficient labour. But if the work is more efficient, he claims that the money is due to the men as wages for service rendered, and, if the money is due to them, he holds there should not be this hedging about, compelling the men to take stock, and restricting them as to buying and selling. He demurred to the statement that the scheme of Sir George is going to be a remedy. A poser was put by Canon Cromwell, who inquired of Sir George how he would advise a humble shareholder in companies to press this question of co-partnership upon directors. One other critic, in addition to Mr. Shaw, was Mr. F. Maddison, M.P., who regards Sir George as an extremist so far as his views as to the state of the social system is concerned. He also approves of Trade Unions as wage regulators, and as being the only means of preventing directors playing with the wage factor. From his experience in the North, working people are not that propertyless class that Sir George Livesey paints them; and he urged Sir George not to think that the world is bound up in the South Metropolitan Gas Company. After all, Mr. Maddison agrees that there can never be contentment while there is practically a propertyless class, nor can there be any security for human liberty, excepting in the possession of property. We have drawn this criticism from the discussion, and omitted all the kind endorsement of the policy of the South Metropolitan and South Suburban Companies that fell from the lips of Mr. Aneurin Williams, Mr. Henry Vivian, M.P., and perhaps a dozen other speakers, who properly look upon the result as the real criterion of the success of methods, in this connection as in others.

Naturally Sir George devoted himself to his critics and not to his supporters in his reply, two or three points from which we may give. Dealing with Mr. Shaw, and his assertion that the men were treated as children, Sir George averred that in many matters they are children in these things; and the only way to make men of them is to train them. The Companies have made men of a number of good fellows, who were formerly children in money matters. The men themselves admit that, if there had been liberty in drawing the bonus, the result would have been failure. The assumption that the men are not as ordinary shareholders was disputed. If they choose to sell their stock or pawn it, they can. But then the Company reserve the right to say such men are not acting in the spirit of true co-partnership; and therefore, if this sort of thing is done, the Company have an equal right to refuse to renew their agreements. These men get no sympathy from their mates. As to Mr. Shaw's criticism about wages, Sir George pointed out that they are regulated by the law of supply and demand. So far as the South Metropolitan and South Suburban Companies are concerned, they pay the full current rate of wages, and the bonus is in addition. But every penny of the £43,000 distributed among the men in the case of the South Metropolitan Gas Company last year, and the £3000 distributed among the South Suburban men, was earned. The work done at the stations now goes through with almost mechanical precision. No advice could be given to Canon Cromwell. Sir George has tried to move directors in this matter, with but little success outside the two Southern Companies, the Commercial, the Chester, and the Newport Companies; and the only suggestion he can make to believers in the system is to "keep pegging away." As to workmen being propertyless, the experience of Sir George has been in London, where there are thousands of workmen who have saved money; but the thousands are a very small proportion of the whole. These are only a few points from a reply full of interesting feature.

COAL AND COKE STATISTICS FOR 1905.

Another Record Output of Coal.

THE total output of coal in the United Kingdom during last year reached the highest figure yet recorded—namely, 236,128,936 tons. So we learn from the Home Office report and statistics relating to the minerals raised during 1905, which were issued last Thursday, in the form of a Blue-Book, as Part III. of the Report on Mines and Quarries. This achievement, it may be remarked, follows on another record output which was accomplished in 1904, when the number of tons was 232,428,272, which was over 2,000,000 tons in excess of the output for 1903. The quantity raised, therefore, has shown a very decided tendency to increase during the past three years. But the monetary aspect has not been so satisfactory from a coalowner's point of view—the value having been only £82,038,553 last year, as against £83,851,784 in 1904, and £88,227,547 in 1903. In 1904, the average price of coal at the pit was 7s. 2·58d., as compared with 7s. 7·93d. in 1903; while last year this figure of 7s. 2·58d. further fell to 6s. 11·39d.

On the present occasion, practically the whole of the net increase in output came from England, whose 164,980,092 tons is 3,624,925 tons more than in 1904. The 35,219,212 tons of Wales is 294,867 tons less than that of the preceding year, and the 90,335 tons of Ireland 15,302 tons less; the total of these two decreases being a little more than balanced by a gain on the part of Scotland, whose 35,839,297 tons represents an increase of 385,908 tons over 1904. It may be pointed out that the term "coal" throughout these statistics includes anthracite, the total output of which last year was 3,112,054 tons, of a value of £1,340,931. The average price of coal per ton for the different fields was as follows: Scotch, 5s. 9·44d.; Northern, 6s. 4·41d.; Yorkshire, &c., 6s. 6·83d.; Lancashire and Cheshire, 7s. 3·78d.; Midland, 6s. 10·26d.; small detached fields, 8s. 0·07d.; North Wales, 7s. 4·90d.; South Wales, 8s. 9·15d.; and Irish, 9s. 6·29d. As already remarked, the average price over the kingdom was 6s. 11·39d. per ton; while the average price in the London market was 15s. 6d., as compared with 15s. in 1904. The average price per ton at the pit in England was 6s. 9d. in 1905, 7s. 1d. in 1904, and 7s. 7d. in 1903; in Wales, it was 8s. 10d. in 1905, 9s. 2d. in 1904, and 9s. 6d. in 1903; and in Scotland, 5s. 9d. in 1905, 5s. 11d. in 1904, and 6s. 3d. in 1903.

The quantity of coal exported (exclusive of coke and patent fuel, and of coal shipped for the use of steamers engaged in foreign trade) was 47,476,707 tons, against 46,255,547 tons in 1904; the declared values of the coal being £24,859,129, compared with £25,491,414. There was the equivalent of 1,290,183 tons exported in the form of 774,110 tons of coke; and 997,609 tons in the shape of 1,108,455 tons of patent fuel. Adding to this the 17,396,146 tons of coal shipped for the use of steamers engaged in the foreign trade, the total quantity of coal which left the country in 1905 was 67,160,645 tons. The declared value of the exports of coke was £555,207, and of patent fuel £646,784. Of the coal exported, Germany, France, and Italy again took over 6,000,000 tons each; Germany being first with 7,659,957 tons. The quantity of coal, culm, and cinders imported into the United Kingdom, though still very small indeed, was last year much greater than in 1904; the figures being 48,501 tons, against 2768 tons, and the value £42,582, compared with £2689. Practically the whole of this amount—47,504 tons—however, came from Holland. America does not figure in the list at all on the present occasion. The amount of coal remaining for home consumption was 168,968,291 tons, or 3·910 tons per head of the population.

There is a new feature in the report this year; it being pointed out that particulars relating to the production of coke and briquettes, and the number of coking ovens in use, have been obtained from manufacturers in accordance with a suggestion made by the Royal Commission on Coal Supplies. Returns as to the production of coke were furnished by 531 colliery owners, 1095 gas companies, and 50 other owners of coke ovens. In the absence of any compulsory powers of obtaining the information, however, it is impossible to say whether the returns are complete, though it is believed that the figures may be taken as approximately correct. Returns as to the manufacture of briquettes were obtained from all firms known to be engaged in the industry. The tables show that in England 29,327,728 tons of coal were used in making 15,976,078 tons of coke, of a value of £9,325,925. For Wales, the figures were 1,622,792 tons of coal, in making 944,806 tons of coke, of a value of £644,463. For Scotland, 2,208,634 tons of coal, in making 989,616 tons of coke, of a value of £562,320. For Ireland, 276,139 tons of coal, in making 118,949 tons of coke, of a value of £88,746. For the Isle of Man, 17,650 tons of coal, in making 8536 tons of coke, of a value of £4345. The total for the United Kingdom was 33,452,943 tons of coal, in making 18,037,985 tons of coke, of a value of £10,625,799. There were last year 31,060 coke-ovens in use in the United Kingdom, of which 25,514 were beehive ovens. Other ovens mentioned in the tables are the Simon-Carvés, Semet-Solvay, Coppée, Bauer, Koppers, and Otto-Hilgenstock. According to the returns received from 271 works where coking plant is in use, at 46 of these places bye-products were recovered in 1905. As to briquettes, in the whole of the United Kingdom 1,109,797 tons of coal were used in their manufacture; the value of the product being £717,671.

No natural gas whatever was obtained last year; but there is mention of a small quantity of petroleum—46 tons, of a value of £69—having been secured in Dumbartonshire. As to the imports of petroleum, the return by the Board of Customs is as follows (in gallons): From Russia, 68,493,036, as against 129,599,066 in 1904—which speaks eloquently of the disturbed state of that country; from the United States, 206,718,108, against 151,159,632—here we have nearly the deficiency of Russia made good; and other countries, 24,899,191, against 21,372,445. The value of last year's imports was: From Russia, £1,045,768; from the United States, £3,908,567; and from other countries, £468,789. The total quantity imported last year was 300,110,335 gallons, of a value of £5,423,124, as compared with 302,131,143 gallons, of a value of £5,839,033, in 1904.

MUNICIPAL INCOME AND EXPENDITURE.

Statistics from the Annual Local Taxation Returns.

IN the "JOURNAL" for the 30th ult. some figures were quoted from Part V. of the Annual Local Taxation Returns relating to the councils of boroughs (other than Metropolitan boroughs); and brief attention may now be given to the statistics regarding urban district councils which are contained in the same Blue-Book. It should, however, be again pointed out that the figures are for as long ago as the year 1903-4.

The number of urban district councils in England and Wales for districts other than boroughs dealt with in the report is 813; and the transactions are much on the same lines as those of the town councils, though generally, of course, on a smaller scale. Many of the figures deal with gas, water, electric lighting, market, and tramway undertakings; and so the expenditure is to some extent of what is termed a "reproductive" character—a fact which has to be borne in mind in calculating the effect of the outlay on the local taxation. The receipts of urban district councils (not being borough councils), excluding those from loans, during the year under review, amounted to £9,778,728. This included sums received from county councils under the provisions of the Local Government Act, 1888, in respect of the maintenance of roads, and for other purposes; but they were only a small proportion of the total receipts from rates, which were £5,487,076. In addition to the rates, the income included £845,370 from gas-works (of which, so far as could be ascertained, £606,228 was from gas-rentals, and £181,635 from the sale of residual products), £635,427 from water-works (of which £447,586 was from water-rates, rents, or charges within the district for domestic purposes), £166,170 from electric light undertakings, and £166,530 from tramways and light railways. There is a sum of no less than £898,291 included in the receipts on account of elementary education; and deducting this the income of the councils for the year was £8,880,437, as compared with £8,389,739 in the preceding twelve months. The amount raised during the year 1903-4 by means of public rates represents 56 per cent. of the total receipts; and the returns from reproductive undertakings, together with those in respect of private improvement works, was rather more than 25 per cent. The total expenditure of the councils (excluding that defrayed out of loans) was £9,608,065. This included £1,691,004 on roads and streets, £831,555 on education, £553,580 on gas-works, £473,348 on public lighting (including £60,896 for lighting by electricity), £358,991 on water-works, £86,011 on electric lighting (not being public electric lighting), £121,500 on tramways and light railways, and £2,516,717 on principal of loans repaid (otherwise than out of sinking funds or redemption funds), payments to sinking, &c., funds, and interest on loans. Excluding the outlay on elementary education, the amounts expended by the councils during the years 1902-3 and 1903-4 respectively were £8,346,088 and £8,761,947. The increase of £415,859 in the latter year was chiefly in the loan charges (principal repaid, interest, and payments to sinking funds and redemption funds) and in items relating to public works. The sum accounted for by additional loan charges is £205,242. The cost of the repair and maintenance of 2446 miles of main roads was £494,258, or £202 a mile; while the outlay on 11,374 miles of roads other than main roads was £893,772, or £79 a mile.

The expenditure out of loans, and sums spent in anticipation of loans during the year under review, amounted to £3,807,745, which included £127,415 for gas-works, £404,290 for water-works, £546,954 for electric lighting, and £762,425 for sewerage works. The expenditure out of loans (for purposes other than elementary education) was less by £347,889 than that for the preceding twelve months. There was a considerable falling off in the outlay on gas and water works; but the expenditure on tramways (£337,852) largely increased. The total amount raised by loans during the year was £3,930,135, for the following purposes, among others: Sewerage works, £745,594; electric lighting, £612,988; water-works, £432,953; tramways and light railways, £372,785; and gas-works, £119,577. The loans raised in 1903-4 (excluding money borrowed for elementary education) were less than in the previous year by £227,524. The sums raised in respect of sewerage works, gas-works, and water-works were respectively smaller by £173,573, £128,037, and £111,377; but tramways and electric lighting showed considerable increases. The amount repaid out of loans (excluding unexpended balances of loans applied to the repayment of principal) was £1,493,947.

The outstanding loans of the councils at the end of the year under review totalled £32,415,809, including about £2,850,000 in respect of loans transferred to them under the Education Act. In this total are included sums borrowed under the Act of 1903 for the provision of working balances. The following are some of the items included in the debt: £8,337,577, or 25·7 per cent., for sewerage works; £5,355,028, or 16·5 per cent., for water-works; £3,293,091, or 10·2 per cent., for gas-works; and £1,894,195, or 5·8 per cent., for electric lighting. The loans outstanding in respect of reproductive undertakings and works of private improvement, it is pointed out, represent a large proportion of the debt; the aggregate for water-works, gas-works, electric lighting, tramways and light railways, markets, and works of private improvement being no less £12,584,629, or 38·8 per cent. of the total. The loans outstanding (exclusive of elementary education) increased during the year ended March 31, 1904, by £1,327,405. The amount then remaining in sinking funds and redemption funds for the repayment of loans was £471,703. The sum paid to the funds during the twelve months was £206,130; while the amount taken out and applied to the repayment of principal was £178,536.

According to the census of 1901, the total population of the 813 urban districts other than boroughs was 7,272,560; and the total assessable value of the areas for general district rates, or other rates out of which the expenses of the councils were defrayed, was £31,283,866. The rates levied in the year under review, for purposes other than elementary education, were equivalent to 3s. 2·8d. in the pound on the total assessable value. This figure compares with 3s. 3·1d. in 1902-3, 3s. 3d. in 1901-2, 3s. 1·9d. in 1900-1, and 3s. 0·9d. in 1899-1900. During this period the receipts from rates have increased by 26·6 per cent.; while the income from the reproductive undertakings has grown by 60·1 per cent.—with, of course, at the same time, a considerably increased expenditure. The loans outstanding (excluding education) rose from £21,013,554 at the end of 1899-1900 to £29,340,480 at the end of 1903-4—being an increase of 39·6 per cent.

WATER ACTS FOR 1906.

In recent issues of the "Journal," the chief features of the Gas Acts of the session have been noticed. We now deal with the Acts which contain provisions relating to the supply of water; taking first those obtained by Companies.

The Holyhead Water Act authorizes the Holyhead Water Company to construct new works, comprising an intake from the lake known as Llyn Traffwll, a pumping-station, and two lines of pipes, which are to be completed in four years, instead of seven as asked for in the Bill. A large number of provisions are contained in the Act for the protection of the estate of Lady Margaret Maria Verney. The Company applied for power to raise additional capital to the amount of £40,000, inclusive of premiums; and this sum has been granted. The maximum dividend on it is to be 7 per cent. It is to be put up to public auction or sold by tender, and any not so disposed of may be offered to the shareholders, the employees, or the consumers. Borrowing powers to the extent of one-third are sanctioned. The Company may supply water by meter for domestic or other purposes; and the price to be charged is not to exceed 1s. 6d. per 1000 gallons. The water is to be effectually filtered, and if the provisions in this respect are not complied with, the Company are liable to a penalty not exceeding £10 a day. [*Parliamentary Agents: Messrs. Lewin, Gregory, and Anderson.*]

The North Sussex Gas Company, which was incorporated by an Act obtained last year for the supply of gas to the parishes of Billingshurst, Wisborough Green, Slinfold, and Kirdford, in the county of Sussex, have now been empowered to construct works for the supply of water within the limits defined by the above-named Act. The works specified are a well, pumping-station, and service reservoir at Billingshurst; and three years are allowed for their completion. The charge for water is to be on the net rateable value of the premises supplied, and it ranges from 8s. 6d. per annum, for houses rated at not more than £5, to from 10 down to 6 per cent. above this figure. The Company may supply by meter water, to be used for other than domestic purposes, at a rate not higher than 2s. per 1000 gallons, with a minimum payment by the consumer of 8s. per quarter. The capital sanctioned by the Act of last year, and the borrowing powers in respect of it, are doubled; and the Company may raise the additional capital by ordinary or preference shares or stock, to carry interest at the maximum rate of 6 per cent. per annum. The Company's name is changed to the North Sussex Gas and Water Company. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Portsmouth Water Company promoted a Bill to enable them to construct works, enlarge their limits of supply, and raise further capital. The proposed works were of an extensive character; but these and the second object of the Bill were abandoned during its progress through Parliament, and the Act obtained is simply to authorize the raising of further capital and for some other purposes. The amount originally required—£225,000—is reduced to £99,000, with a maximum dividend of 5 per cent., and it is to carry borrowing powers to the extent of one-third. Existing enactments as to the charges for water and the pressure at which it is to be delivered, refer to the present limits of the borough of Portsmouth; and the rates are to be assessed upon the annual value of the premises supplied. The charge made for water sold by measure is not to exceed 2s. per 1000 gallons. Section 56 of the Company's Act of 1857 and certain clauses (mainly bearing upon the purity of water) in the Cosham, Havant, and Emsworth Water Order, 1872, are repealed. Government buildings are to be supplied on terms and conditions to be agreed upon or settled by an arbitrator under the Arbitration Act, 1889. The Company are to commence forthwith the construction of the necessary works for the filtration of the water supplied by them; and they are to be completed by Dec. 31, 1909, under a penalty not exceeding £10 a day for default. The Act contains some provisions for the protection of the Gosport Water Company; and nothing in it is to prejudicially affect any right, power, privilege, or exemption of the Crown. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

The South Lincolnshire Water Act incorporates the South Lincolnshire Water Company with powers of supply within certain parishes in the county of Lincoln, and authorizes them and the Urban District Council of Spalding to construct works and provide water. The limits of supply are so much of Deeping St. Nicholas, Little and Long Sutton, and other parishes, as lies to the north of the Bourne and Lynn joint line of the Midland and Great Northern Railway Companies. The capital of the Company is £30,000, in £5 shares; and borrowing powers to the amount of one-third are granted, as well as permission to issue debenture stock. The works which the Company are authorized to construct are two reservoirs, a pumping-station, and a water-tower at Weston, and a reservoir and water-tower at Little Sutton; those to be undertaken by the District Council are a conduit or pipe-line commencing at the Council's new well at Bourne, and joining another terminating in the parish of Pinchbeck. The works are to be completed within five years from the passing of the Act, or two years less than the time applied for. The Act contains the necessary provisions to enable the Company to take and use lands and waters; and also others whereby the Council may raise the necessary money, and apply their funds for the purposes of the Act. The water is to be supplied for domestic use at charges based upon the rateable value of the premises; but for other purposes, by meter, the price is not to exceed 1s. 6d. per 1000 gallons, with a minimum of 8s. per quarter. Provision is made for affording supplies in bulk. The Act contains protective provisions in favour of the Great Northern Railway Company, the Midland and Great Northern Railways Joint Committee, the Black Sluice Commissioners, and the Bourne Council and Water Company; and the other provisions are those usually found in Water Acts. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Sutton District Water-Works Act has been obtained primarily for the preservation of the sources of supply of the Sutton District Water Company. The circumstances under which the Bill was promoted have already been fully recorded in the "Journal."* The Act sets forth that it shall not be lawful for any company, body, or person, except by express authority of Parliament, to convey, by pipe or conduit, for sale or use beyond the Company's area of supply, water taken from any well or watercourse within the area. At the same time, nothing in the Act takes away the right of any landowner, other than a railway or a gas company, to supply with water any part of his estate situated partly within and partly beyond the area of supply, or to construct works for the purpose; nor does it interfere with the right of any railway company to use on any engine or carriage beyond the area of supply, any water obtained within it. The rights of the Corporation of Croydon in regard to the abstraction by them of water from land in their possession and to the construction of works within the watershed of the River Wandle are preserved; and the Act contains a provision protecting the Metropolitan Water Board. [*Parliamentary Agent: Mr. J. Kennedy.*]

Bills were promoted to incorporate a Company for the supply of water to the parish of Heacham, in Norfolk, and to authorize the Great Yarmouth Water Company and the Lowestoft Water and Gas Company to construct additional works and take water from the River Bure; but the former measure was withdrawn, and the latter was rejected by a Committee of the Commons, after having been passed through all its stages by the House of Lords.

The Acts containing provisions in regard to water supply which have been obtained by local authorities will be noticed in a subsequent article.

* See also an article by Mr. Vaux Graham, the Company's Consulting Engineer, which appears elsewhere (p. 382) to-day.

Incandescent Gas Lighting in the City.—In connection with the report of the proceedings in the Court of Common Council of the City of London last Thursday, reported elsewhere, we give a table, prepared by the Corporation Engineer (Mr. Frank Sumner, M.Inst.C.E.), showing the saving effected by the adoption of incandescent gas lighting in some of the City streets. We may mention, as it is not specifically stated, that, with the exception of Fleet Street, all the lamps employed are those of the James Keith and Blackman Company, Limited.

THE AMERICAN GAS INSTITUTE.

First Annual Meeting.

In accordance with the announcement previously made, the members of the newly-formed American Gas Institute opened their first general meeting in the Auditorium Hotel, Chicago, on the 17th ult., under the chairmanship of Mr. B. W. Perkins, of Altoona (Pa.), the Acting-President. We learn from a short account of the proceedings contributed to the "American Gaslight Journal" by their special correspondent, that there was a gathering of about 400 members. The Acting-Secretary (Mr. J. W. Dunbar, of New Albany), who was one of the founders of the American Gaslight Association, was in attendance.

The meeting having been formally opened, the President introduced the Mayor of Chicago (Mr. Dunne), who accorded to the Institute a hearty welcome; and his kindness was acknowledged by Mr. C. H. Dickey, of Baltimore. The business commenced with the reading of the report of the Board of Control, as there was not to be any set address by the President. An extension of time to the 1st prox. was voted for obtaining admission to the Institute; and it transpired that the number of members at the opening of the meeting was well over 900. The next business was the presentation of a report showing the good work that is being done by the Committee in charge of the educational fund of the American Gaslight Association. It furnished proof that, in the hands of Mr. A. E. Forstall, the Secretary and Administrator, the fund is fully realizing the aims of its originators. This brought the morning sitting to a close.

In the afternoon, Mr. C. H. Dickey, on behalf of the Ohio Gaslight Association, read the report of the Committee on Uniformity of Gas-Meters. It was followed by a paper by Mr. J. M. Rusby, on "Causes of Variation in Consumers' Meters," which gave rise to a good discussion, in which Mr. T. G. Marsh, of Manchester, took a prominent part. At this point, Mr. Perkins vacated the chair, and his place was taken by Mr. K. M. Mitchell. Mr. W. H. Gardiner, jun., of Boston, on behalf of the Western Gas Association, read the report of the Committee on Making Rates and the Additional Business System of Costs. It was fully discussed, and was followed by a resolution to appoint a Committee on Matters of Public Policy, to carry on the work outlined. Next came the report of the Committee on Revision, which was presented and read by Mr. H. B. Harrop on behalf of the Ohio Association. It led to a very spirited debate, the outcome of which was the continuance of the Committee as representing the same Association. Mr. H. L. Doherty explained at length the position of the "Question-Box;" and it was resolved that this should be retained as a portion of the Institute's work. A paper by Mr. W. H. Gartley, of Philadelphia, on "The Delivery of Gas of Uniform Candle Power to the Consumer through all Seasons of the Year," gave rise to a discussion in which some novel theories were advanced. The author was cordially thanked; and it was determined to appoint a Committee to investigate methods of taking the illuminating power of gas. Mr. E. C. Jones, of San Francisco, had prepared a paper entitled "The Effects of High Pressure upon Illuminating Gas;" and in his absence it was read by the Secretary. This was the concluding business on the first day of the meeting.

The second day opened with the noticing of telegrams from members unable to be present, who nevertheless expressed their good wishes for a successful meeting. Mr. Van R. Lansingh, of New York, read an interesting paper on "Mantle Standards," the discussion on which was followed by the report of the Nominating Committee, read by Mr. E. G. Platt. It showed that the following had been chosen office-bearers for the ensuing year:—

President.—Mr. Walton Clark, of Philadelphia (Pa.).
First Vice-President.—Mr. C. F. Prichard, of Lynn (Mass.).
Second Vice-President.—Mr. H. L. Doherty, of Madison (Wis.).
Treasurer.—Mr. T. C. Jones, of Delaware (Ohio).
Secretary.—Mr. J. W. Dunbar, of New Albany (Ind.).

Messrs. Clark and Prichard having expressed their appreciation of the honour conferred upon them by their colleagues, the morning sitting came to a close.

The business was continued in the afternoon. An application from the Iowa Association to join the Institute was considered and assented to; and a report on the results of tests of No. "A" meters, covering the actual workings on a large scale for one year, was read by Mr. Walton Forstall. This was followed by a record, produced by Mr. George Williams, on behalf of the Ohio Association, of their Novelty Advertising and New Business Methods Department; and the discussion upon it was followed by a contribution, read by Mr. W. M. Welch, from the Natural Gas Association, on "Extinguishing the Flame of a 600-Pound Pressure One Million Feet Hourly Capacity Gas Well." It was illustrated by a number of lantern slides, which showed in a very striking way the difficulties of the task which had been successfully accomplished. Mr. H. L. Doherty, on behalf of the Ohio Association, read an interesting report from the Committee on a Standard Method of Testing Fuel-Gas Appliances, for which he was accorded a vote of thanks. A joint production by Mr. Bryce M'Adam and Mr. W. E. Steinwedell, respecting the Wrinkle Departments of the Western and Ohio Associations, was next read by the first-named gentleman. A paper upon "Electrolysis," prepared for the American Association by Mr. A. G. Glasgow (who wrote expressing inability to attend the meeting on account of business in London), was presented, and gave rise to a full discussion. It was decided to carry on the work. The Committee to whom the matter had been referred reported in favour of Washington as the next place of meeting; and their recommendation was adopted. Mr. C. A. Learned followed with a paper on "The Relation of a Commercial Gas Man to the Industry," the joint production, on behalf of the National Commercial Gas Association, of himself, Mr. J. C. D. Clark, and Mr. Richard Thomas. It was a good communication, and was discussed at considerable length. Mr. Forstall brought forward the subject of "Standard Castings;" the work of Mr. D. W. Low, at the instance of the Ohio Association, in respect of the report concerning the "Bureau of Forms and Records, was acknowledged; and a verbal progress report was made by Mr. T. D. Miller. The subject was "The Economic Balance between Calorific and Candle Power," which had been under the consideration of the Western Association. The members decided to continue the work by a properly constituted Committee; Mr. Miller to have charge of it. At this point the meeting was adjourned till next morning; but the principal business was at an end.

Summing up his account of the proceedings, our contemporary's correspondent said that if the subsequent annual gatherings of the Institute were at all like the first, then indeed the organization was "founded on a base that neither time nor shock may successfully assail."

OBITUARY.

We regret to record the death, on the 28th ult., at his residence at Hempsted, at the advanced age of 84, of Mr. ROBERT MORLAND, who for 33 years held the position of Engineer and Manager of the Gloucester Gas Company. Mr. Morland commenced his career as a gas engineer in 1843, at Stranraer, where he continued till 1866. In that year he was appointed Engineer to the above-named Company. The works then had an annual output of 60 million cubic feet, and the price was 4s. 6d. per 1000. The need of expansion to supply the growing wants of the city and to meet the views of the Corporation led to the removal of the works in 1872 outside the city. The Company secured 11½ acres of land at Hempsted, and plans for the construction of new works on thoroughly modern lines were prepared by Mr. Morland, with the assistance of his son, Mr. Thomas O. Morland, who is now Engineer and General Manager of the North Sydney (N.S.W.) Gas Company. On the completion of these works, the old establishment was closed, with the exception of the offices, which continued to be used for another twenty years by the Secretary and clerical staff until the erection of the present offices. Mr. Morland held his position till 1899, when he retired. The output had then increased to 285 millions; and the price of gas had been reduced fully one-half. Mr. Morland's career as a gas engineer had extended over 56 years, and on his retirement he was the oldest gas engineer in the country. He was succeeded by his son, Mr. W. S. Morland, under whom the Company's undertaking has continued to develop. Recent additions have placed the works among the most up-to-date in the country; and the present output is 345 million cubic feet per annum. The interment took place last Wednesday afternoon, in St. Swithin's Churchyard, Hempsted. The Gas Company were represented by Mr. J. H. Jones (Vice-Chairman), Mr. H. W. Grimes (a Director), Mr. W. E. Vinson (Secretary), and Mr. W. E. Tew (Assistant Engineer); and the bearers of the coffin were employees of the Company.

In the list of Fellows who have been recommended by the President and Council of the Royal Society for election into the Council for the ensuing year, we notice the names of Sir Benjamin Baker, K.C.B., Professor Wyndham R. Dunstan, M.A., and Professor Silvanus Thompson.

The marriage has lately been solemnized of M. Victor Monod, the Pastor of the Evangelical Reformed Church at Pontarlier, with Mlle. Germaine Bouvier, daughter of M. Adolphe Bouvier, of Lyons, whose papers presented to the Société Technique du Gaz en France have frequently been noticed in the "JOURNAL."

Engine vibrations have been overcome by a special foundation built for a 20-horse power gas-engine driving a 12½-kilowatt lighting dynamo in a London house. The foundation consists of a 5-inch bed of concrete, on which were laid ten 3-inch by 4½-inch timbers, spaced 6 inches apart. A series of 2-inch holes were bored in the top of each timber, and in these holes were inserted powerful helical springs, capable of carrying 500 lbs. with ½-inch compression—there being 48 springs in all. These springs support a galvanized iron tray, 10 feet long and 5 feet wide, which contains a concrete base, 2 ft. 8 in. thick, upon which the engine is erected. The exhaust and compressed air connections to the engine are of flexible metallic tubing, while all other piping connections are made through rubber hose. When the engine was started on this foundation, it was found that the vibration had been suppressed; but a slight longitudinal swaying of the motor was noticed at first. This vibration was prevented by locating a timber guide at either end of the spring-supported platform; and since then the outfit has operated absolutely without noise.

TURIN GAS CONSUMERS' COMPANY.

Increased Gas Consumption and Extensions to Works.

THE well-printed and well-illustrated pamphlet which we now annually receive, containing the yearly report and balance-sheet of the Società Anonima dei Consumatori di Gas-Luce (or the Consumers' Company) of Turin, is always an interesting document. The last report, which has recently been issued, for the year ending June 30, 1906, and adopted at the annual meeting held on Sept. 14, is no exception to the rule; and we translate from it some of the items of more general interest, and also reproduce three of the several attractive photographs which it contains. This year's report is further noteworthy as it is the first issued under the managership of Signor Rag. Cav. Giacomo Beria, the brother of the former Manager, whose decease on Oct. 26, 1905, was so much regretted by all. Needless to say, this great loss to the Company is referred to more than once in the report in most feeling terms; indeed, the first few pages are entirely devoted to it. His death was an immense loss to his family, to the Company, and to the community. Under his direction, the gas undertaking soon reached a height of prosperity, and the inhabitants of Turin benefited by a price of gas so low that a few years before it would have been thought absurd to expect. That the late Sig. Luigi Beria was an excellent architect, the Gas Company's offices (of which an illustration was given in the pages of the "JOURNAL" at the time of their completion), as well as many other buildings, afford ample evidence. After his appointment in January, 1899, he soon reorganized the administrative department of the Company, entirely reconstituted the technical portion, and brought the works up to the most modern and attractive level, without forgetting for a moment that the final aim of the Consumers' Company of Turin is to sell gas at the actual cost price reduced to the lowest possible limit. Owing to his indefatigable zeal, he had the satisfaction of achieving a sale price of 12 c. per cubic metre (about 2s. 8d. per 1000 cubic feet), which is the lowest price of gas ever reached in Italy. This was effected at the same time that considerable increases of wages were granted to the workmen, who held him in the highest esteem. As a memorial, a modest marble tablet has been erected in the works which were the field of his labours.

The report records continued progress in the consumption of gas, thanks to reductions in its price; thus adding another illustration to many of the wisdom of selling gas at as low a figure as is practically possible. For the year under review (1905-6), the gas consumption was 15,089,819 cubic metres, or about 533 million cubic feet. This is an increase of 1,119,938 cubic metres (nearly 40 million cubic feet) on the previous year's consumption, which was 13,969,881 cubic metres, or about 493 million cubic feet. It may be of interest to state how this amount of 15 million cubic metres of gas has been consumed:—

	Cubic Metres.		Cubic Feet.
Prepayment meters	237,355,	or about	8,383,000
Ordinary ,,	13,400,162	,,	473,248,000
Industrial purposes	200,196	,,	7,070,000
Motive power	210,029	,,	7,418,000
Consumed by Municipality of Turin	1,042,077	,,	36,803,000
Total	15,089,819	,,	532,922,000

Fig. 1.—The New Purifier-House.

On June 30 last, there were 27,613 meters in use as compared with only 26,000 on the corresponding date of the previous year. The average annual consumption of each meter, excluding that used for motive purposes or through prepayment meters, was 516 cubic metres, or 18,223 cubic feet. The gas sold brought in a sum of 2,506,205 lire, or about £100,250, being 57,468 lire, or £2300, more than the preceding year, and this notwithstanding a reduction of 1 c. per cubic metre (2½d. per 1000 cubic feet) in the price of gas. This is another proof that increased facilities always lead to considerably increased consumption. Bad debts were only 0·061 per cent. of the cash received, which is satisfactory, seeing that gas is sold on credit and without guarantee of any sort. The percentage of gas lost has been reduced from 6·7 to 5·7. This amelioration of 1 per cent. on a total make of nearly 16,000,000 cubic metres (about 565 million cubic feet) represents a saving of 160,000 cubic metres, or 5,650,000 cubic feet, corresponding to a value of about 20,000 lire, or £800. During the year, 4234 metres (4630 yards) of new mains were laid; the total length of main now being 283,000 metres, or about 175 miles.

As regards the coal supply, the report states that the coal market during 1905-6 underwent a serious crisis, made much worse by the railway mismanagement which occurred at the beginning of the working of the railways by the State. Every possible precaution was taken by the Company to safeguard against a want of coal; but the crisis was only overcome by the stocks of coal wisely provided some years before. Owing to the Turin works being so far from the sea (and as, of course, Italy has no resources of coal of its own), it is absolutely indispensable to have large stocks of coal in store. These now amount to about 20,000 tons. The price of English coal of the best quality was, in July, 1905, 15s. c.i.f. Savona; it went up to 19s. in April last, and it has dropped to 17s. These fluctuations, however, do not affect the Turin Company, owing to their favourable coal contracts. They are always able to obtain coal at a suitable price, and the report says that the stipulated times of delivery have been fulfilled "with a regularity which, given the exceptional conditions of the market, reflects very great credit upon the firm supplying them." From July 1, 1905, to June 30, 1906, 50,235 metric tons of coal were carbonized, producing 16,017,450 cubic metres, or about 565 million cubic feet of gas. This represents a make of 323 cubic metres per 1000 kilos. of coal carbonized, or, in English equivalents, 11,590 cubic feet per ton, with gas at its outgoing temperature, or 318·8 cubic metres (11,440 cubic feet per ton) with the gas reduced to the temperature of 12° C., or 53·6° Fahr. The report says that these high yields of gas (and similar ones in preceding years) "have always called forth the admiration of all practitioners in the gas industry." The coke market has

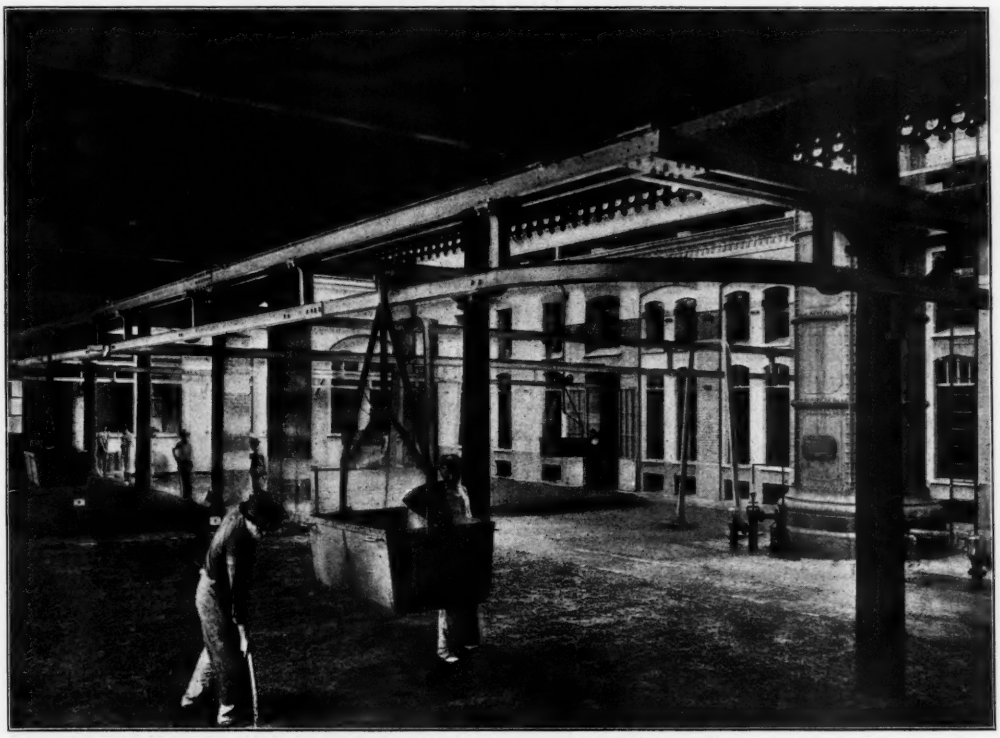


Fig. 2.—Plant for Carrying the Purifying Material.

been characterized by great scarcity, so much so that the supplies had to be curtailed, as the production was much lower than the demand. As regards the public lighting, there are 2897 lamps, being an increase of 34 on the year. A more favourable contract has been entered into with the Municipality, whereby the consumption per burner is fixed at 110 litres (3·885 cubic feet) instead of 100 litres (3·532 cubic feet) as formerly, though the actual consumption varies from 117 to 120 litres (4·132 to 4·238 cubic feet) per hour.

The next section of the report deals with extensions. During the year all the works of reconstruction, principally in connection with the purifying plant, were completed. It is satisfactory to report that, with the new arrangement of the purifiers (see fig. 1), and with the overhead track for carrying the purifying material (fig. 2), the desired results have been obtained—viz., convenience and speed in working, simplicity and safety in handling, and economy in labour. The results achieved have led to the reconstruction of the second purifying-house, which it is hoped will be ready for the coming winter. With the same number of boxes as before, the power of the purifying plant has been largely increased; the labour of changing the material has been reduced; and the air of the works has been made more healthy—the obnoxious fumes arising from the frequent revivifying of the Laming material being done away with, now that richer natural oxide is being used, which requires less frequent changing. The purifying capacity of the works is at present equal to a maximum daily make of 100,000 cubic metres (about 3,500,000 cubic feet) of gas. These extensions have also considerably reduced the naphthalene deposits, which, especially in the winter, prevented the regular distribution of gas. In order to take out the last traces of naphthalene, two special washers (see fig. 3) have been installed and put into use, from which the best results are anticipated. Other work has consisted in systematizing the gas-mains, in enlarging the producer subways, and in fitting up an electrical ventilator for them. After fourteen years' service, a bench of six arches has been remounted; different systems of furnaces being adopted for experimental purposes, so as to ascertain the various fuel consumptions. New works, which will also be required, will include plant for treating the ammoniacal liquor, and a new gasholder of 30,000 cubic metres (about 1 million cubic feet) capacity. There will further be wanted a new bench of retorts, which will complete the present house, and give a guarantee for meeting future demands for gas.

The average pay of the stokers is 5·28 lire, or about 4s. 3d. per day, and for the labourers 3·60 lire, or nearly 2s. 11d. The stokers have 12-hour shifts; but their actual work does not take more than five hours. Outside of the retort-house, the former 10-hour day has been reduced to one of 9½ hours. Workmen's houses have been built; and all sick, old age, and other funds are fully maintained. In fact, reading the report of this prosperous Italian gas company, one cannot help being reminded of the similarity of their solicitude (though, of course, on a much smaller scale) to that of the South Metropolitan Gas Company for their workmen.

As regards any possible municipalization of the gas undertaking, it seems to be a long way off. An inquiry was begun on March 30, 1905, and went on till May 4 of the present year, since which date nothing has been done; and, as the report says, the question seems to have been purely an academic one without any practical value. Two other questions have arisen with the Municipality of Turin—one relating to damage done to gas-mains during the making of sewers, and the other to the municipal gas-tax. The litigation on the former question resulted in a victory for the Gas Company; the Court of Arbitration declining to hold that the gas-mains could be considered as *res nullius*. The Municipality have already made full compensation. The town tax of 3 centimes per cubic metre of gas (equal to 8d. per 1000 cubic feet) is a more serious matter, and was referred to

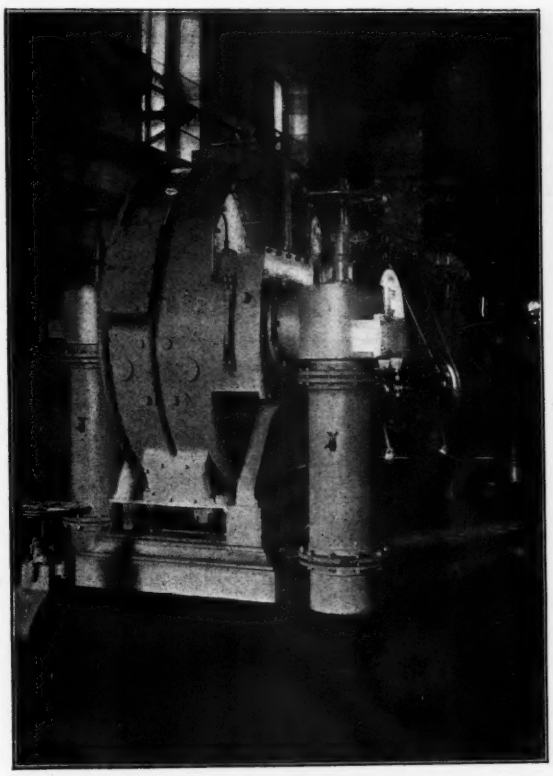


Fig. 3.—Naphthalene Washers.

in our report of the Italian Gas Society's annual meeting. [See "JOURNAL" for Sept. 18, p. 759.] This tax the Gas Company have sought to have declared to be illegal; but the tribunal before which the question was tried decided on the 23rd of July last, that it was not so, and that, in arriving at the value of the gas, the existing governmental tax of 2 c. per cubic metre (5½d. per 1000 cubic feet) was to be included. This decision thus establishes the usurious principle of putting one tax upon another tax. An appeal is being brought, and it is sincerely to be hoped that such a fiscal absurdity as this will be speedily nullified.

With this wish, and with our congratulations to those concerned in the successful direction of the Company—especially mentioning the President of the Board of Administration, Sig. Cav. Gioachino Fornas, the new Manager, Sig. Giacomo Beria, and the newly appointed Technical Manager, Sig. Ing. Bonino—we will conclude this review of their last year's work.

SERVICE CHEMISTRY.

As briefly mentioned in the "JOURNAL" last week, the work on the above subject by Professor Lewes, which was first published in 1889, has now reached its third edition, in the preparation of which he has been joined by his colleague, Mr. J. S. S. Brame. While the general plan of the book has been maintained in the new edition, the whole has been thoroughly revised and brought up to date, with some slight modification in the arrangement of the subject-matter. Primarily intended for the officers in the Naval and Military Services, there is, nevertheless, much matter in it of value to engineers generally, as, apart from the purely chemical portion, many diverse subjects are treated, from both a chemical and a practical point of view, in Professor Lewes's well-known manner; and in many cases the subject discussed is one of which but a scanty literature exists. In particular, the chapters on boiler incrustation and corrosion and their prevention, on the problems connected with heating and ventilating, and on the spontaneous ignition of coal, deal clearly with matters which are of the highest importance to gas engineers; and though much of what appears has been given by Professor Lewes in his lectures before the Society of Arts, the present work has the advantage of bringing all the more important points together in one volume. The four chapters on explosives, dealing with gunpowder, gun-cotton, smokeless powder, and blasting explosives, while of less direct importance to gas engineers, give a succinct and most readable account of the development of the explosive industry, and of the immense changes which have taken place therein during the past twenty years. The same may also be said of the final chapter on the subject of the fouling of ships' bottoms.

Reinforcement of Sound by Gas.

In the "JOURNAL" for May 17, 1904, it was recorded that, among the large and varied collection of scientific appliances exhibited at the *conversazione* of the Royal Society at Burlington House the previous Friday, the Hon. C. A. Parsons showed an "Auxetophone"—an ingenious instrument for use in gramophones or phonographs instead of the usual reproducing diaphragm. There were two jets—one of gas and the other a mixture of gas and air—and when these were lighted, a phonograph in connection with the instrument gave out very audibly the sound of the voice of an Italian operatic vocalist. When a speech was turned on, the flame made every gradation of the human voice distinguishable. Its application to a violin in the lecture-room afforded a very striking demonstration of its powers. The matter is referred to again because the instrument was brought into use during the last few weeks of the season of Promenade Concerts just closed at the Queen's Hall, Langham Place, and we believe it was found to be of practical value in the orchestra by increasing the tone of one section of the stringed instruments.

International Prizes Offered by the Italian Gas Society.

In the "JOURNAL" of Oct. 24, 1905, p. 239, we gave particulars of the Italian Gas Society's prizes, which they offered, without distinction of nationality, for the best papers on selected subjects. The result, as we announced in our recent review of the proceedings of the Society's annual meeting at Milan, was that only the third prize was awarded. This was of the value of 500 lire (£20) and a bronze medal, and was given to Messrs. Wouter Cool and P. H. Hendriks, both Engineers of the Rotterdam gas undertaking. Their paper on "Horizontal, Inclined, and Vertical Retorts" was given fully in the "JOURNAL" for Sept. 18, p. 768. The other two prizes, consisting of 1000 lire (£40) and a gold medal, and 750 lire (£30) and a silver medal, not having been awarded, are carried over to next year, and are again open for international competition—the subjects being the same as before. The latest date by which the papers must be sent in is March 1, 1907. They should be addressed to Signor Federico Laeng, the Secretary of the Society, and Manager of the Brescia Gas-Works, Italy. In addition to this international competition, 1000 lire are also set apart for distribution among the authors of the best papers contributed to the ordinary annual meeting of the Society; but only members can compete in this case.

THE PROTECTION OF A PUBLIC WATER SUPPLY.

By W. VAUX GRAHAM, M.Inst.C.E.

A PRECEDENT of great interest to water authorities has been created by the Sutton District Water Act which received the Royal Assent in August last.* The history of this Act, the full title of which is "An Act for the Preservation of the Sources of Water Supply of the Sutton District Water Company and for Other Purposes," is as follows.

The Sutton District Water Company supply a rapidly increasing suburban neighbourhood some 40 square miles in area, on the confines of London, containing a present population of between 50,000 and 60,000 persons. Their water is obtained from wells sunk in the chalk at Sutton, in Surrey. The London, Brighton, and South Coast Railway Company, whose line from London to Portsmouth passes through Sutton, serves the district. Last autumn, it came to the knowledge of the Water Company that the Railway Company were about to bore for water in the chalk, upon land of their own adjoining the railway, within 1000 yards of the Water Company's wells; and inquiries elicited the alarming information that the intention of the Railway Company was to obtain a large quantity of water, and to convey it along their line for the general use of their undertaking, including the supply to the new Victoria Terminus and their large carriage-cleaning yard at Streatham.

The Water Company were advised that the abstraction of a large quantity of water from a boring in the position proposed could not fail to injuriously affect the yield of their wells. They were also advised by eminent lawyers that they had no remedy under the ordinary law, inasmuch as the Railway Company were boring upon their own land, and were entitled to exercise the privileges of the ordinary landowner in regard to underground water. This left the Water Company no alternative but to proceed by Private Bill to protect themselves; and a Bill was therefore promoted, the operative clause of which was as follows:—

> From and after the passing of this Act, it shall not be lawful for any company, body, or person, except with the express authority of Parliament hereafter obtained, to convey by pipe or conduit, for sale or use beyond the area of supply, water taken from any well or watercourse within such area [the area of supply of the Water Company].

The intentions of the Railway Company having come to the knowledge of the Water Company too late to give the statutory notices in November, the Bill was a "late Bill," and petitions had to be presented to both Houses of Parliament praying that the Standing Orders might be dispensed with. The matter had, however, aroused so much public interest—the whole of the public authorities having jurisdiction within or adjacent to the Water Company's area of supply supporting the action of the Company—that these difficulties were ultimately overcome, and the Bill was referred to a Committee of the House of Commons in July.

In the meantime, while the fate of their own Bill in its initial stages was uncertain, the Water Company made an attempt to bring the Railway Company to terms by opposing the Brighton Railway Bill on the Second Reading. A certain measure of success attended this action. The Brighton Company's Bill was an Omnibus Bill relating to the general affairs of the Company, but making no reference whatever to the boring complained of, which they claimed to be able to carry out under their ordinary powers as landowners. The Board of Trade, however, interfered; and Mr. Kearley said in the House of Commons that "he had conveyed to the Company the opinion of the Board, which was that what was proposed was rather beyond the powers for which the Railway Company should press—that, in fact, they would constitute themselves a *quasi* water company; and he did not think the House would view such a thing with great favour." The result of this was that the Railway Company undertook not to convey water farther than six miles from the boring; and thus the Victoria Terminus portion of the project was killed. This action of the Board of Trade in itself establishes a valuable precedent for the protection of public water supplies.

There remained, however, the carriage-cleaning yard at Streatham and all the stations—43 in number—and works of the Company within the six-mile radius to which water might be conveyed; and the Water Company therefore decided to proceed with their Bill. The result completely justified their action. The Committee of the House of Commons passed the Bill without amendment, and the Committee of the House of Lords confirmed this decision when the Bill was presented to them.

In addition to the Local Authorities, great assistance was given to the Water Company by the landowners and millowners on the River Wandle. The proposed boring was within 800 yards of the Carshalton springs of that river; and the most conclusive evidence was laid before the Committees of what the effect of pumping from the boring would be. The contention of the Railway Company was that, as they would pump from a depth of 350 feet from the surface, they would draw upon an inexhaustible supply of water in the deep chalk, without affecting in any way the surface springs or the comparatively shallow wells. Unfortunately for this theory, the Water Company (the boring having been completed) were able to observe the effect on the springs of a three days' continuous pumping test of its yield, which was made

* The Act is noticed in an article which appears on p. 378.—ED. J.G.L.

shortly before the Bill came before the House of Commons Committee. It is not necessary to describe these observations here; suffice it to say that they destroyed the Railway Company's case, and most conclusively established the fact that the apprehensions of the Water Company were well founded.

LIGHTING RAILWAY CARRIAGES BY GAS.

Upright v. Inverted Mantles.

READERS of the "JOURNAL" are aware that the subject of the use of incandescent gas lighting for the passenger carriages has for some few years engaged the attention of the technical staffs of the French Railway Companies, with the result that the system has been adopted on several lines. Its general advantages have been admitted; but opinions have differed in regard to details. So far as we remember, the Eastern of France Company were the pioneers in the adoption of incandescent gas lighting for their coaches; and in an article which appeared in the "Revue Générale des Chemins de Fer" in the spring of 1903, the results of the experiments which had been in progress during the preceding two years were recorded. Subsequently the Western Company, whose officials had also been considering the subject, made a trial of a special arrangement of lamp fitted with an inverted burner; and the conclusion arrived at was that this position was more advantageous than the upright one, inasmuch as the supply-pipe supporting the burner was abolished, and the light was consequently increased in intensity and more evenly diffused. This conclusion was embodied in a report by M. Chapsal, the Chief of the Company's technical staff, which appeared in the publication already named. Meanwhile, the Eastern Company had been experimenting with the inverted burner in 40 of their coaches, representing 135 lamps. The trials were carried out by M. Biard, the Chief Engineer, and M. Mauclère, the Inspector of the rolling stock; and they are described at considerable length in an article in the current number of the "Revue." They extended over a period of more than two years; and the result was a decision in favour of the upright burner. This has consequently been largely employed; and last April the Company had 1021 coaches, representing 9149 lamps, lighted on this system, and the rolling stock in course of construction was being arranged for it.

In the article in question, the authors describe in great detail, and with the aid of a number of diagrams, the photometric experiments carried out with the two kinds of mantles, and tabulate the results. They then compare the two types of burners from the point of view of their durability and economy in use, and arrive at the conclusion that the balance of advantage is on the side of the upright burner. In the course of their final chapter they set forth their reasons for coming to this decision. They say that, from an æsthetic point of view, the inverted burner is more attractive than the upright one, owing to the absence of the supply-pipe. From this cause, too, the amount of light might well be presumed to be greater; but their photometric observations showed that while with the inverted burner the light is stronger immediately below the lamp, the corner seats, which are those most sought for by passengers, are much better lighted by the upright burner. With the latter, the mantles last longer; their average life being 3½ times greater than with the inverted burner. They can be more easily renewed; and in the event of a breakage, sufficient of the mantle is left to maintain the lighting of the compartment. While, with inverted burners, carriages have been plunged in darkness through the fracture of mantles, this has never been the case on the Eastern Company's system. Finally, from the point of view of economy, the authors say the superiority is undoubtedly with the upright burner. Taking as a basis the cost prices of the two lighting systems, and the liability to breakage in the respective cases, they estimate the additional annual outlay which would result from the substitution of inverted for upright burners at 8 frs. 10 c. (6s. 9d.) per lamp; and this on the number of lamps in existence would come to 138,000 frs. Though the choice of one or other type of mantle may depend upon the circumstances of any particular railway, the experiments carried out for the Eastern Company justified them in continuing the use of upright burners; thereby affording increased comfort to the passengers without entailing much additional labour on the staff or expense for maintenance.

A **Model Tar-Distilling Plant.**—A recent number of the "Chemical Trade Journal" contains a reproduction of a complete tar-distilling plant made by the Leeds and Bradford Boiler Company, Limited, for an establishment in Japan. The plant is for working up the bye-products of the coke-ovens, and consists of five 12-ton tar-stills, five condensing-tanks with cooling-worms within them, five separators, and seven receiving-tanks for the various distillates. The pitch cooler is 9 feet in diameter, and, in addition, there are two loco-type steam-boilers, and a set of pumps for feeding the stills and other purposes. There are also all the necessary tar, steam, and water pipes, with all the requisite valves, gauges, &c. The illustration shows the plant exactly as it would be set up for use; and it is interesting from the fact that this cannot be done when the plant is installed, owing to portions of it being covered by brickwork.

POSITION OF INCANDESCENT LIGHTING.

By Professor DREHSCHMIDT, of Berlin.

The lecture which Professor Drehschmidt, the Chemist to the Berlin Municipal Gas Undertaking, gave before the meeting of the German Association of Gas and Water Engineers last summer was briefly reported in the "JOURNAL" at the time. The revised and extended text of the lecture has now been published in the "Journal für Gasbeleuchtung," from which the following abstract translation has been prepared.

The author, in his communication on the inverted gas-light last year, foreshadowed a further paper on some advances in this new method of lighting—especially in connection with its application to the lighting of streets and squares. The quality of the incandescent light depends, however, as much upon the constitution of the mantle as on the burner; and, in the first place, reference may now be made to an important novelty in mantle manufacture.

The first usable mantles were made with a knitted "stocking" of crochet thread as the basis for the illuminating material. These mantles rapidly got out of shape, and fell off in lighting value. The ramie mantles, introduced by Buhlmann in 1898, were the first in which this defect was considerably diminished. The use of cotton mantles has now become less usual. Both cotton and ramie mantles, however, fell off in lighting power, and were very easily broken. An improvement in these respects has been achieved by means of artificial silk. In 1894, Knöfler applied artificial fibres. He added the lighting "salts" to the collodion solution from which the fibres were prepared, and converted them into the oxides by treatment with alkaline agents. The manufacture of mantles was thus, however, too difficult and costly a process. Plaissetty was the first to make usable mantles of artificial silk. He impregnated the net of that material with the lighting salts just as in the case of cotton or ramie mantles. Notwithstanding the apparent lack of porosity of the artificial silk, the same quantity of the oxides of the rare earths is taken up by it as by three times its weight of ramie or cotton. The higher price of the artificial silk is thus counterbalanced. For instance, an artificial silk mantle will fall from 1·7 grammes to 0·6 gramme on incineration, whereas a cotton mantle yielding the same weight of oxides on incineration would have previously weighed about 4 grammes. If, however, the impregnated and dried artificial silk mantle is directly incinerated in the usual manner, it falls to pieces. In order to avoid this, Plaissetty treated the mantles before incineration with ammonia, whereby he converted the soluble salts of the earths into insoluble oxides. The skeleton of oxides so obtained is relatively soft and flabby. But it is stronger than the cotton or ramie mantles, as may be readily proved by handling or by a shock-giving testing apparatus. In regard to constancy of light, the mantles differ somewhat according to the variety of artificial silk used, as the following abstract of experimental results obtained with different kinds of Plaissetty mantles shows:—

Durability Tests of Candle-Power and Strength of Plaissetty Mantles.

Number of hours in use:	1.	100.	500.	700.	900.
Silk used.					
Candle Power (*) "Oberbrucher"	67·0	71·8	69·4	71·9	76·1
" " "Viskose" . .	75·7	71·2	59·7	—	—
" " "Chardonnet".	77·4	80·6	—	76·0	—
No. of shocks resisted. "Oberbrucher"	400	450	458	—	800
No. of shocks resisted. "Viskose"	1500–2000	1000	583	—	—

(*) English candles. Conversion from Hefners on basis of 1 candle = 1·1 Hefners.

The candle-power tests were made with a rate of consumption of 120 to 121 litres (= about 4¼ cubic feet) per hour, under a pressure of 16-10ths. The strength of the mantles was determined on a shock-giving apparatus. For the most part, the fracture, when it occurred, was longitudinal; but if the mantles were too wide, they chafed away just above the top of the burner. Fracture in the middle, or at the top, as occurred with the earlier kinds of mantles, practically never took place. Small holes in the network of the mantle did not extend or affect its strength or durability. The illuminating power is not exceptionally high, but may be expected to improve under better manufacturing conditions. The strength greatly surpasses that of former mantles; but both strength and illuminating power vary with the kind of artificial silk used. The mantles of Oberbrucher silk retain unimpaired both their strength and illuminating power for 1000 hours' use. The old descriptions of mantles will rarely withstand 100 shocks on the same apparatus; generally, they fail at 20 to 50 shocks.

The advantages of greater durability and constancy of light of the artificial silk mantles are to be traced to the different structure of the silk threads and the peculiar condition of the lighting material on them. The skeleton web of the new incinerated mantle has the appearance of a bundle of unwoven wires, while that of the older mantles appears to consist of innumerable small fibres. The ash of the first has a sandy feel; that of the latter is

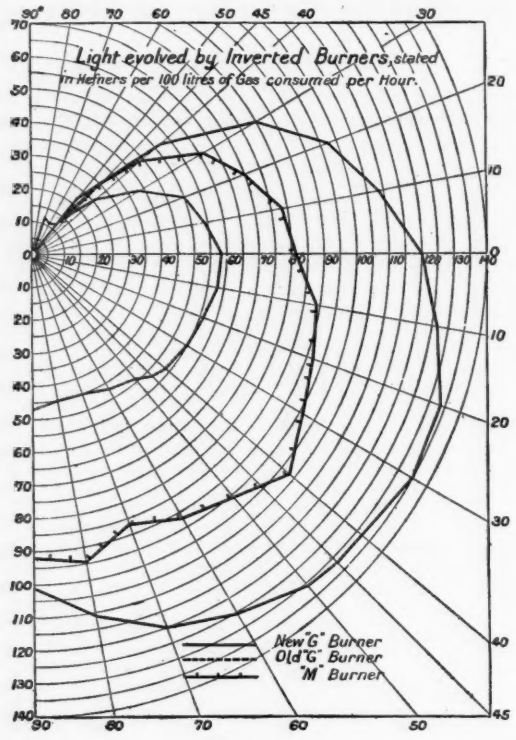

Light evolved by Inverted Burners, stated
in Hefners per 100 litres of Gas consumed per Hour.
New "G" Burner
Old "G" Burner
"M" Burner

Fig. 1.

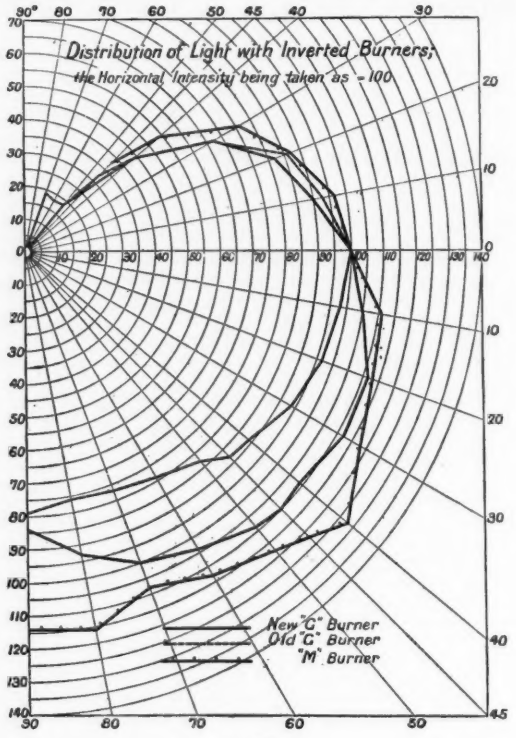

Distribution of Light with Inverted Burners;
the Horizontal Intensity being taken as = 100.
New "G" Burner
Old "G" Burner
"M" Burner

Fig. 2.

Diagrams Illustrating Dr. Drehschmidt's Paper on Incandescent Lighting.

soft and mealy, as though the particles have in the one case been well fritted together. This condition of the threads is no doubt mainly responsible for their great strength. According to preconceived ideas, the net had to be impregnated with the lighting salts in the form of nitrates, because the latter intumesce on incineration and leave a frothy, very voluminous oxide of large surface. The new mantles on the other hand contain originally hydroxides, which do not swell on heating, and do not afford a large surface. It would, therefore, have been expected that they would not have a good illuminating power.

But, in this, the earlier ideas were at fault. The constancy of illuminating power is to be traced to the threads not being frothy and ramified, but compact and not liable to alter in shape during burning. Also the fact that the lighting salts exist in the unignited Plaissetty mantle in the form of hydroxides has the advantage that they are not hygroscopic like the old mantles, so that they may be stored without depreciation of quality. But a special mode of igniting and shaping them is required, because the net—owing to the absence of nitrates in the impregnating material—is not readily combustible. The Plaissetty mantle can be put without previous ignition directly on to a high-pressure burner of the same diameter as the top of the burner on which it is to be used, and hardened under a considerably lower pressure than is used with the older types of mantles. It is not (like them) moved up and down over the burner, but is gradually moved upwards while being held exactly vertical, according as the burning off proceeds. The whole operation can—with a somewhat higher gas pressure than Plaissetty adopted—be very easily carried out without any special practice, and is well adapted for mechanical methods of burning off.

So far, the Plaissetty mantle has only been used to a small extent, and in a few places—*e.g.*, Paris, Milan, and Copenhagen. In Germany, it has not been much used; but a Berlin incandescent gas light company has recently acquired the Plaissetty patent rights and will soon be making these mantles on a large scale. Up to the present, Plaissetty mantles have not been made for inverted gas-burners, and the inherent difficulties of shaping inverted mantles are probably intensified with artificial silk. No doubt, however, they will be overcome.

Passing on to inverted gas lighting, the author last year demonstrated its great economy in comparison with upturned incandescent burners if the average lower hemispherical illumination only is taken into account. Since that time a burner has been put upon the market which gives far more favourable results than any then known. It is of pleasing shape, and is entirely closed downwards by a hemispherical glass, so that it is not sensitive to draught. It has somewhat the appearance of the Nernst electric lamp. The results of photometric testings of the burner ("G") are set out in the following table alongside those of the best inverted burner ("M") tested last year, and those of the upturned incandescent burner. For the sake of comparison with Professor Drehschmidt's table of last year [see "JOURNAL," Vol. XCI., p. 101], the candle powers are stated on the same basis—viz., the English candle=1·14 Hefners. The later determinations of the Reichsanstalt [see "JOURNAL," Vol. XCV., p. 102] point to a ratio of 1 candle=1·1 Hefners being more nearly correct.

Illuminating Power of Incandescent Burners.

—	Upright Burner Without Reflector.	Inverted Burners.		
		Clear Globes.		Opal Globe.
		"M" (best in 1905).	"G" (best in 1906).	"G" (best in 1906).
Consumption per hour . . cubic feet	4·42	3·92	3·18	3·18
Horizontal illuminating power, candles	78·9	78·9	95·0	74·0
Mean illuminating power—				
" " spherical "	59·8	68·9	76·8	50·2
" " lower hemispherical "	54·6	90·4	101·5	56·1
Mean illuminating power, spherical, per cent. of horizontal	75·8	87·3	81·0	67·9
Mean illuminating power, lower hemispherical, per cent. of horizontal . .	69·1	114·4	106·9	75·8
Candles per cubic foot per hour consumed—				
For mean spherical illuminating power	13·54	17·60	24·16	15·80
For mean lower hemispherical illuminating power	12·36	23·08	31·94	17·65

The gas pressure was in all cases 40 mm. = 16-10ths.

The 1906 "G" inverted burner is made by the firm which made the older type of burner—designated "G" in the author's paper last year—which then gave the lowest results of the inverted burners reported upon. It is necessary, therefore, to distinguish between the new "G" burner and the 1905 pattern. The new "G" burner yields nearly 32 candles per cubic foot of gas consumed per hour on the average of its illuminating power over the lower hemisphere, whereas the "M," which was the best of last year's burners, yielded only 23 candles similarly, and the upright incandescent burner only 12⅛ candles. It is evident from these figures how rapid and great has been the advance of the inverted gaslight, and how enormously it excels in economy the upright burner. A comparison of illuminating power (stated in Hefners) developed at different angles per 100 litres (= 3·53 cubic feet) of gas consumed can be readily made from the annexed diagram (fig. 1) in which the light curves are given for the new (1906) "G," the old (1905) "G," and the "M" inverted burners. The distribution of light in the room for these three burners is shown graphically in fig. 2, where the light at different angles is given relatively to the horizontal illuminating power of the particular burner, which is taken as = 100. The illuminating power of the new "G" burner directly downwards, and at angles below 30° to the horizontal, is appreciably less than the horizontal illuminating power. This is advantageous for the general lighting

of a room, provided as in this case, the downward illumination is sufficient to afford quite good lighting of the area beneath.

The new "G" burner was tested, with both clear and frosted saucer-shaped screens, and with an opal globe, as well as with a clear globe; and it was found that, notwithstanding the loss entailed, there was still a good lighting effect—surpassing that of the "M" burner with clear glass, and far exceeding that of the upturned burner with clear chimney. Notwithstanding the great advantages named, the introduction of the inverted gas-burner is attended with difficulties. There are many defective types of inverted burner still made, which cause smell and injury to the fittings from the products of combustion. The smell arises from imperfect combustion—due very commonly to the products being carried away in an unsuitable manner. The fittings, however, in other cases as well suffer from the heat conducted from the burners; and to avoid this, it is absolutely essential to insert insulators between the burners and fittings, so as to hinder the transference of heat.

Less fair complaints are made against inverted burners on account of difficulties due to improper regulation or management; and for these complaints the fitters are often directly or indirectly responsible. For instance, if the pressure much exceeds about 12-10ths, inverted burners as supplied are apt to behave badly, and the holes in the nipples should be reduced accordingly when they are fitted. Frequently, it is alleged that more mantles are used up than with the upturned burners, although the author's experience is to the contrary. The cause is frequently that too long an interval is allowed to elapse between turning on the gas and lighting it; but it may lie in the faulty construction of the burner. Proper bye-pass jets to light the burners at the right time get over the difficulty; but they are not provided with many types of inverted burners, or if provided are faulty.

It does not appear to the author that the bye-pass flame can be replaced by chemical igniting devices, as they are not sufficiently reliable, and do not ignite the gas quickly enough. Perhaps a satisfactory igniter may come from Auer von Welsbach's discovery of pyrophoric alloys.* An alloy of 70 per cent. of cerium and 30 per cent. of iron is highly pyrophoric, and on very slight friction yields sparks having great igniting properties. An igniter of this kind has answered well for several months in the laboratory of the Berlin Municipal Gas-Works, and it might be applied to the inverted burner.

It is important for the development of the maximum illuminating power that good and properly fitting mantles should be used. As there is as yet no standard pattern of inverted burner, mantles of different sizes and different origin are used with the different burners, and it is well known that the products of the different mantle factories vary greatly in quality.

(To be continued.)

* See "JOURNAL," Vol. LXXXVI., p. 960, and Vol. XCIV., p. 218.

A French Gas and Electricity Directory.

We have received from the publishers (Librairie Jeanmaire, Paris) the "Répertoire des Industries Gaz et Electricité" for 1906-7. This work, which was first issued about eleven years ago, has been considerably improved, especially in recent years, under the direction of M. Maurice Germain, the Editor of the "Journal de l'Eclairage au Gaz." In response to several requests, the present edition contains many new features, and is larger than its immediate predecessor by about 130 pages. A new chapter, containing a concise record of the legal, administrative, bibliographic, and commercial events of the past year, is placed at the head of the volume; and it is followed by a useful series of tables and memoranda occupying about 80 pages. The lists of gas-works and electricity stations have been carefully revised and extended; more than 130 new central stations being given in addition to those appearing in the previous volume. The book, which is well got up, is packed full of information of one kind and another, which is presented in a form that makes it readily available.

Standards for Street-Lamps.—"The Times" in a recent issue contained the following letter on the above subject from "An Artist": "It is incomprehensible that no evidence of artistic control is observable in the design of the standards for street lighting in London. In the centre line of Oxford Street are now being erected for such service a long series of standards, of incredibly contemptible design, which will seriously disfigure this important thoroughfare. One may ask, in reference to such commonplace work, what, in face of such deplorable evidence, return the public are getting from the considerable cost of the Government art schools. Are the results of a half-century and more of art teaching in our schools of design to be found in the new lighting-standards of Oxford Street? May it not be asked, Who are the responsible parties who thus dispense with artistic guidance on a point involving the teaching influence of familiar things made beautiful, as they are conspicuously so in Paris and other Continental cities? In Paris, the street-lamp standards are among the most beautiful objects in its streets; in London, they are among the most degrading."

MECHANICAL RETORT STOKING.

As already briefly mentioned in the "JOURNAL" (Vol. XCV., p. 22), several short papers were read at the last meeting of the German Association of Gas and Water Engineers upon the subject of the mechanical drawing and charging of retorts. We obtain the following account of what was said by the different speakers from the "Journal für Gasbeleuchtung."

Experiments at Hanover

The first paper was presented by Herr L. Körting, of Hanover, who began by describing the reasons that had induced him to abandon hand-charging. For many years every endeavour had been made to decrease the severity of the labour in the Hanover retort-houses. The charging floors were 10 feet above the ground-level; and the coke, as withdrawn, fell directly through them to the ground. The coal scoops were filled from hoppers extending the whole length of each house—so conveniently arranged that the coal had only to be carried a few steps. Each retort was charged by two insertions of the scoop; a subsequent levelling of the coal being unnecessary. Stoppages of the ascension-pipes were rare; and the working results were excellent. For the year 1903, the average make of gas was 11,460 cubic feet per ton of coal, 9210 cubic feet per day per heated retort, and 9350 cubic feet per day per charged retort. The quantity of coke available for sale was 52·96 per cent. of the coal, and that of the breeze 5·42 per cent. Two men were employed for every bed to draw and charge the retorts; one man for every fourteen beds to clinker the fires; and one man for every ten beds to quench the coke. At the time in question the German Association of Factory Hands ("Verband der Fabrikarbeiter und Arbeiterinnen Deutschlands") forced its way into the gas industry, with the object of benefiting labour by making things difficult for the employer; and so the day arrived when it became requisite to seek the assistance of machinery in reducing the number of men employed.

In the summer of 1903, Herr Körting had the opportunity of inspecting a charging and drawing machine employed in Paris; and he ultimately allowed similar apparatus to be installed experimentally at Hanover.* The charging machine was of the horizontal screw-type, fed with coal from above by means of three screw-conveyors. The drawing machine was a discharger, expelling the coke with a ram from the further mouth of the retort. The retorts previously in use at Hanover were single-ended; but they were easily converted into through retorts to suit the discharger, by removing a partition wall in the centre of the settings. As a result of the trials at Hanover, it was found that the French apparatus exhibited several defects. At the time of charging, an extraordinary amount of fine coal dust was produced, and set in motion by the screw-conveyors—smothering everything, or burning with a long flame at the mouth of the retort. It was very difficult to charge the retorts evenly. If the charger was a little too high, all the coal went to the far end; if too low, all the coal remained near the mouth. Whenever the retorts became slightly out-of-line, and whenever the charge was not properly distributed, discharging was troublesome, as the coke caked, and could not be pushed out. Ascension-pipe stoppages were far more frequent with the 20-feet through retorts than with the 10-feet single ones. For these reasons, the Paris machine was only retained in service for a few months (it has, indeed, Herr Körting remarks, not succeeded anywhere—being superseded by the simpler and better De Brouwer projector), and the Hanover gas undertaking reverted to the use of single-length retorts.

In passing, Herr Körting offered the following explanation of the more frequent ascension-pipe stoppages noticed when employing through retorts: Though half the gas evolved in a through retort is supposed to escape at one end and the other half at the other end, such division never really occurs; but all the gas travels by the ascension pipe which is the less deeply sealed in the hydraulic main. Hence much of the gas evolved in a through retort is overheated because of the distance it has to travel over the incandescent coal, and so the one ascension pipe that is in operation becomes choked. Herr Körting admitted that through retorts were commonly employed in England; and he mentioned that he had recently inspected a very well-designed device at Bournemouth for equalizing the dips. He felt, however, that more lengthy experience was needed before it could be said that the equalizer would work satisfactorily when the setting was hot and had warped.

After the trials of the Paris apparatus had proved abortive, it was settled that West's scoop-charging and drawing machines, operated by compressed air, should be tried at Hanover. By last November, forty beds of nine retorts each were being charged mechanically. It was not, however, till March that it was possible to throw some old six and seven retort direct-fired settings out of operation; and then certain repairs, which could not be effected under fire, were needed in the newer benches. Hence the mechanically charged retorts have only been working for a short time under normal conditions. At the date of his paper, Herr Körting scarcely hoped to obtain with the West machines results

* An illustrated description of the machines appeared in the "JOURNAL" for June 28, 1904, pp. 946-7.

equal to those of 1903. There was nothing to say against the machines themselves. They were strong and worked well. The drawing of a retort took one minute; and the charging 30 seconds. Hence one charging machine was equivalent to two drawing machines. Nevertheless, the make of gas per retort had fallen from 9200 to 8830 cubic feet, and the make per ton from 11,460 to 11,120 cubic feet.

These deficiencies were attributable to the imperfect imitation of the conditions of hand-charging by the charging-machine. When a retort was charged by hand, the coal from the first scoop, tipped to the left, lay properly against the left wall of the retort. The second scoop then entered—not in the centre of the retort, but towards the right in the middle of the empty space; and when it was tipped to the right side, the coal fell against the right wall of the retort, leaving an even layer which did not require levelling with the rake. The machine scoop always entered centrally into the retort; and although its left and right tipping distributed the coal to some extent to the left and to the right, the sides of the retort were never covered.

The improved West scoop, fitted with a central blade, which appears to have worked well at Crefeld, could not be used at Hanover owing to the smaller retorts; and the use of a blade in a smaller scoop made it difficult to fill the scoop properly from the slot of the coal-hopper. An even distribution of coal in the retort was also rendered difficult by the necessity for running the scoop into the retort at exactly the correct height. As the open end of the scoop could not be completely filled with coal, the extremity of the retort was not covered at its first entry. At its second entry, therefore, so much coal must be pushed forward that the end became covered. If the scoop was slightly too high, too little coal was pushed forward; if too low, the quantity was too great. Hence it was always necessary to use the rake at Hanover if thickening of the tar and stoppages of the ascension-pipes were to be prevented; and the rake was a tool to which the men particularly objected.

Moreover it was not so easy with machine charging to adjust the charge to the condition and temperature of the retort. Machine charging tended rather to the overloading of the retorts, which affected their lifetime. The vigorous action of the drawing machine seemed to break more of the coke than was the case with hand drawing. The coke near the end could only be removed by cautious and repeated blows, which occupied too much time if the rest of the retort was very full. Hence it had been decided at Hanover only to draw by the machine what could be extracted within the space of one minute—leaving the residue to be drawn by hand. A West coke conveyor was laid down at Hanover at the time when the retort machinery was installed. Two conveyors, with the characteristic travellers of malleable cast iron, running in front of the retort-settings delivered the coke to a transverse conveyor, which took it either to the crusher or to the store. Quenching was performed during the first part of the journey; and at the place where the transverse conveyor began to rise, screens were provided to remove the dust and the water. Partly by the action of the drawing machine, partly by the friction on the conveyor, but partly also by the more efficient screening, the amount of saleable smalls rose from its original figure of 10 per cent. to 20 per cent. of the saleable coke.

For the purpose of comparing the amount of labour required in hand and machine charging, Herr Körting included in "retort-house labour" everything between the removal of half the coal carbonized from the store (the other half being delivered directly into the retort-house by the railway trucks) and the screening of the coke. In the time of hand labour, two shifts were worked every weekday and one on Sundays. In each shift, one stoker was employed per bed of nine retorts; one coke-quencher per ten beds; and one man per three beds in the day shift only to attend to the coke-transporter. Three retorts were drawn in each bed every 90 minutes. When the machines were introduced, the length of the shifts was reduced to eight hours; and six men were needed to attend to every bench of twenty-nine retort beds—thus: One to open the retorts and clean the ascension pipes, one to work the drawing machine, one to finish the emptying of the retorts, one to work the charging machine, one to use the rake and close the lids, and one to feed the producers, &c. In the time of hand labour, when the make of gas was 9200 cubic feet per day per retort, 56 beds had to be fired to produce 4,610,000 cubic feet of gas per day; after the introduction of machinery 58 beds had to be fired, because the make per retort fell to 8830 cubic feet. Three pairs of machines were required during the four winter months, and two during the rest of the year. Hence the numbers of men employed were as follows:—

Hand-Charging.		Machine-Charging.	
Coal delivery	8	Coal delivery	6
Coal breaking	—	Machine attendant	1
——	—	Coal distributors	4
Drawing and charging, 2 × 56	112	Drawing and charging, 3 × 3 × 6	54
Sunday gang for ditto	56	——	—
Coke quenching	12	Compressor	3
Coke delivery	16	Coke transporter	4
	204		72

The use of machinery, Herr Körting went on to say, not only decreased the quantity of labour in the retort-house, but improved its quality. The work was less exhausting, but continued more uniformly throughout the shift, and required more intelligence. Hence older and feebler men could be engaged than formerly; and gradually a staff of careful and experienced hands could be collected and retained in the retort-house until a feeling of mutual confidence between employers and employed arose which was highly distasteful to the social democrats.

Machine stoking was adopted at Hanover, as already stated, to solve labour difficulties; and having done so it might be said to be successful. There was no idea of effecting economy. In fact, it would be hard to work more cheaply than was the case at Hanover in the days of hand-charging. The following figures, calculated for an annual make of 1130 million feet, showed machine-charging to be somewhat more costly. When charging by hand, the quantity of coal carbonized was 100,000 metric tons. To bring half of this coal into the retort-house cost £417;* charging, &c., cost £7350; moving the coke, £1918; supervision (at £400), repairs, and cleaning ascension-pipes, £870—total, £10,555. The coal itself, at 18s. per ton, cost £90,000; the bye-products brought in £60,725; leaving a net cost of £39,830. When using the West machines, the quantity of coal carbonized was 103,226 metric tons. To bring half this into the retort-house cost £258; breaking and distributing it cost £700; charging and drawing (including compressed air, steam, and oil), £4760; handling the coke (including 8500 cubic feet of gas per day for the 20-horse power conveyor-engine, oil, water, &c.), £1102; supervision (at £500), repairs, and cleaning ascension-pipes, £970; 10 per cent. interest on £20,000, £2000—total, £9790. The coal itself cost £92,904; the bye-products (taken at the same prices as before) brought in a sum of £61,184; leaving a net cost of £41,510. This showed an annual balance of £1680 in favour of hand-charging. Herr Körting admitted that the figures might not be quite accurate. It was possible that the coal was at fault. Complaints had been made about Westphalian coal. Nevertheless, the calculation was interesting because it showed how seriously the books of a gas undertaking were affected by a small reduction in make of gas per ton.

Results at Crefeld.

The next speaker was Herr Lubszynski, who described the results obtained with the West charging and drawing machinery at Crefeld, where the plant had been in operation for about three years.† Machines were introduced into the retort-houses for the same reasons as those already given by Herr Körting. They had been found to be simple and trustworthy. In fact, although there were no spare machines in the Crefeld works, practically no interruptions had occurred during their use. In view of what had already been said, and what was well known respecting the West machines, it did not appear necessary for the speaker to discuss them at length; and he confined himself to quoting the works' figures obtained in the year 1902-03, when all the retorts were charged by hand, so that they might be compared with the figures of 1904-05, when all the charging was done mechanically. This was a fairer method of comparison than that involved in contrasting the figures given by one factory where hand charging was retained with those emanating from another undertaking where machinery had been installed. The Crefeld figures were—

	1902-03.		1904-05.
Make, millions of cubic feet	359	..	384·5
Average make per long ton, cubic feet	9900	..	10,830
Make per retort-day, cubic feet	8110	..	8210
Average charge per retort, pounds	443	..	426
Average number of shifts worked per 24 hours	52·1	..	21·35
Maximum number of men in January	170	..	70
Average number of beds under fire	13·59	..	14·46
Average number of retorts under fire	121·71	..	128·28
Working expenses	£8255	..	£4398

The fifth item in this table means the average number of men performing one "day's" work, or one shift of labour, about the retorts every 24 hours. The figures, said Herr Lubszynski, showed very clearly how the use of machinery enabled the number of stokers to be reduced. The reduction in number facilitated the introduction of eight-hour shifts in the retort-house, causing the extra expense involved in shortening the hours of labour to be no more than about £250. It should be noticed that the working expenses fell by £3857, although the make increased by 25·5 millions. The larger make of gas per ton was explained by the author as being due to the shorter time during which the lids of mechanically-charged retorts remained open, and to the much more even distribution of the coal in the retorts than when the latter were charged by hand.

The financial effect of introducing charging machinery into the Crefeld works might be calculated thus: On the working expenses of the year 1902-03 there would have been a saving of £3857, as shown above; and, owing to the larger make of gas in the mechanically charged retorts, 1991 metric tons less coal would have been carbonized—representing, at the price paid for it, a saving of £1412. The total saving would thus have been £5269. On the other hand, about 6¾ million feet of gas were consumed in 1904-05 in generating power for the retort-house machinery; and this, at its actual value, was worth £417. The additional plant cost about £15,000, 12 per cent. of which, written off for depreciation and interest, was £1800. Adding these two amounts together, and subtracting the sum from the total saving, a net balance of £3052 a year would be left in favour of mechanical charging and drawing. In consequence, the Crefeld gas under-

* Throughout this abstract the German mark is taken at an even shilling.

† A lengthy account of this installation (with many illustrations) appeared in the "Journal" for July 28, 1903, pp. 228-33.

taking (the capital value of which stood in the books at £175,000) was able last year to set aside the sum of £10,800 for interest, &c., and yet to show a profit of £28,000 on a make of about 388 million feet.

De Brouwer Machines at Lichtenberg.

The third speaker was Herr Tasch, of Lichtenberg, where De Brouwer projectors and dischargers were recently installed. Herr Tasch had nothing but praise for these machines; they worked without a hitch and gave excellent carbonizing results. He was, however, unable to hand the meeting any precise figures on the subject, because the machines were only brought into operation last December; and the opportunity was taken to replace the old single 10-feet retorts by 15-feet through retorts with ascension pipes at the front end only. He now employed three gangs of men in the retort-house, working twelve-hour shifts in rotation—a system which was satisfactory to the hands. Each shift consisted of four men for a make of 707,000 cubic feet—one to work the projector, one the discharger, one at the back of the settings to guide the coke into the conveyor, and one in front to open and close the lids. As the discharger worked more rapidly than the projector, the attendant on the former had time to clear up after the charging operation ended. Employing equal parts of English and Upper Silesian coal, the projector charged the retorts quite uniformly; but if the coal were rather too small, it did not properly cover the far end. The average make varied between 11,120, 11,260, and 11,360 cubic feet per ton, which was higher than in the old days. Discharging through the far end of the retort proceeded smoothly. If the coke would not move at the first insertion of the ram, it was withdrawn and inserted a second time, when the coke generally passed out without delay. The machines were driven by direct-coupled electric motors. They were free from fragile parts; and the only trouble that had yet occurred with them was the seizing of a bearing which a man had forgotten to oil.

The De Brouwer discharger was more compact than other drawing machines. The space in front of the settings at Lichtenberg was 23 feet wide; but it might safely be reduced to 21 feet or 20 feet. On the other hand, owing to the heat of the coke, the space behind the settings (now 13 feet) might advantageously be increased to 18 feet. Ascension-pipe stoppages were no more frequent with the new long retorts than they were with the short retorts employed at the time of hand-firing. Three years ago the wages paid to the stokers in Berlin were 4·80 marks per shift, now they were 5·50 marks, and it was impossible to say how much higher they would rise. The use of charging machinery was not merely beneficial by reducing the number of hands, but also by its creation of a more experienced staff in the retort-house, who did not have such severe physical labour to perform. Nevertheless, the use of the machines did not require great practice, as all the adjustments were made mechanically. Herr Tasch felt no hesitation in recommending the adoption of the De Brouwer plant, more especially for gas-works of medium size.

The "Kobold" Machines.

The fourth speaker was Herr Eitle, of Stuttgart, who described the two types of charging machines and the discharger made by his firm. He first dealt briefly with the "Zwilling" charger, the essential portion of which was a longitudinally split scoop. The two halves of the scoop were, said Herr Eitle, so hinged together that they either touched at the lowest part—forming a concave receptacle for the coal of the ordinary form, or opened, grab-fashion, till the coal dropped through the central slot. The scoops could be worked by hand or mechanically. In the latter case, they were supported about a vertical axis in such a way that, on removal from the retorts, they swung round parallel to the face of the setting, and were ready to be loaded again. This scoop was in use in over 100 gas-works in Germany and abroad.

The "Kobold" charger, as already known, was a centrifugal projector.* It consisted of a truck travelling on overhead rails carried by the retort-house walls, and either the settings or columns built close in front. The truck bore a vertical frame on which the projector moved up and down, to suit the different heights of the retorts. The projector itself was a hopper containing a revolving fan with a fly-wheel outside, driven by a belt from an electric-motor carried on the truck. The outlet of the projector terminated in a sliding tube with a vertical baffle-plate at its end. During the introduction of the charge, the tube was pushed forward until the baffle-plate virtually closed the mouth of the retort—production of dust and flame being thus avoided. Above the projector hopper was a receptacle in which the coal was weighed; its outlet being controlled through a sliding-valve, operated from the platform of the machine. A device was fitted whereby the speed of the fly-wheel was made to vary according to the weight of the coal fed into the projector. If, therefore, the attendant altered the weight of the charge to suit the conditions of the retort, the machine itself adjusted the projecting force till the coal eventually lay uniformly over the entire surface of the retort.

The operation of charging, Herr Eitle stated, was complete in from seven to ten seconds; the charge being variable between 350 and 485 lbs., and the energy consumed being 2·5 to 2·8 horse power. If the coal-bunkers extended the whole length of the retort-house, the weighing hopper on the projector was loaded directly from them; but if the store was at one end, the traveller was provided with a storage hopper of its own, capable of holding sufficient coal to charge a number of retorts. In this case it also bore an elevator to fill the storage hopper—all the parts being closed in to prevent dust. Herr Eitle claimed as special advantages for the machine, the compulsory weighing of the coal, the power of the attendant to vary the charge, the automatic control of the projecting force to suit the weight of the charge, and the perfect distribution of the coal in the retort.

The discharging machine, which, like the former, had recently been improved from the form in which it was best known, consisted essentially of a pair of hollow helices or worms, with right and left handed convolutions respectively, geared together, and revolving in opposite directions. They were supported on a travelling truck and driven electrically. As the worms were pushed into the retort, they loosened the mass of coke, separating it into lumps which entered between the blades, and were gradually drawn forwards to the mouth. The worms themselves continued their onward motion till they reached the far end, when they were bodily drawn back again, bringing all the coke with them, and cleaning the sides of the retort. As the front coils of the worms wore out first, arrangements were made to replace them; and this renewal could be done four times. The worms were cooled with water, and no longer became seriously heated. The excess of water was employed to quench the coke. The movements were effected by gearing, instead of the original chains; all the bearings, &c., being tightly enclosed. The operation of drawing, according to Herr Eitle, lasted only about 35 seconds.

* The various forms of the machine have been fully described and illustrated in the "JOURNAL" from time to time. See Oct. 6, 1903, p. 45; April 5, 1904, p. 27; May 31, 1904, p. 580; June 28, 1904, pp. 947-9; and Dec. 5, 1905, p. 688.

At the close of the papers a short discussion took place, in which some questions were asked as to whether the "Kobold" machines were in actual employment. Herr Eitle replied that they were used regularly on three "settings." Herr Fortsch, of Ludwigshafen, mentioned that he had installed a pair of the machines experimentally, but they were no longer in operation. They had worked well enough, and had not been discarded in consequence of failure. On several occasions work had to be suspended in the Ludwigshafen retort-house because the electric current (obtained from the municipal generating station) failed without warning, rendering the machines useless. The stokers also resented the introduction of labour-saving machinery. Herr Fortsch was not able to substantiate the claim that the "Kobold" machines were rapid in their action; it was found by him to be preferable to work the drawing machine slowly.

A Gas Director's Jubilee.

A very interesting function took place last Tuesday morning, at the close of a business meeting, in connection with the High Wycombe Gas Company. The Chairman (Mr. George Wheeler) presided, and was accompanied by the whole of the Directors; and the Manager and Secretary (Mr. Harold Baker) was in attendance. The Chairman said the Directors intended that day to mark their sense of the esteem in which they held their colleague, Mr. James Thurlow, and their appreciation of the active interest he had taken in the affairs of the Company for a long period. The Company held their first meeting on Aug. 28, 1848, and Mr. Thurlow was present in the capacity of Auditor. On Sept. 2, 1856, he was appointed a Director; and he had therefore recently attained his Jubilee. To commemorate this event, and also to mark their esteem for him, the Directors asked him to accept a silver breakfast dish bearing an appropriate inscription. The presentation having been made by the Chairman, Mr. Thurlow said words failed him to adequately express his feelings at this act of kindness on the part of his brother Directors. He could not thank them sufficiently; but he could assure them that a pleasant means of remembering their kindness would be found in the fact that, so long as he was spared to do so, he should have their gift in daily use. Before the proceedings concluded, the whole of the Directors took the opportunity of joining their Chairman in his congratulations to Mr. Thurlow on his wonderful record as a Director of the Company, and on the fact that he had been associated with it ever since its formation.

Lectures on Gas at Belfast.—As was intimated some months ago in the "JOURNAL" would be the case, a special course of instruction for gas officials has been planned by the Library and Technical Instruction Committee of the Belfast Municipal Technical Institute. A syllabus of lectures and demonstrations has been drafted in consultation with those who desire instruction; and every effort is being made to arrange a course which shall be thoroughly practical and useful to those concerned. In addition to general subjects, it is intended to provide instruction in the elements of chemistry and physics, and also to include a number of practical subjects of use to officers in a gas department—for example, gas mains, burners, street lighting, and gas-stoves. In connection with the course of instruction, Mr. A. M'I, Cleland, the Chief Inspector of the Gas Department, expressed his willingness to deliver two or three lectures on "Incandescent Mantles and Gas-Burners." The first of these has already been given.

REMOVAL OF NAPHTHALENE FROM COAL GAS.

Remarks on the Michigan Paper.

In the last number of the "JOURNAL," we gave the concluding portion of the paper presented by Messrs. White and Barnes, at the recent meeting of the Michigan Gas Association, recording the results of their researches into the subject of the removal of naphthalene from coal gas. It will be of interest now to summarize the remarks to which it gave rise.

The first speaker was Mr. V. F. Dewey, who testified to the extreme accuracy with which the investigation had been carried out. He expressed surprise at the apparently slight effect the centrifugal separator had over the ordinary Pelouze and Audouin apparatus, as he expected considerably different results. Possibly they would come back to the old system employed in the European plants, of a much slower travelling gas and larger primary condensers, as apparently the conclusion arrived at was that the time element was a most important one, and that instead of cutting this down, as the manufacturers of apparatus had been trying to do in America, they would have to increase it, even if it meant a larger outlay and expense in the construction of works. The only way in which they had been able to overcome the naphthalene trouble was by having an absorbent placed after the primary condensers.

Mr. Knight said he was unable to discuss the question from an engineer's standpoint, but he testified to the value of the work the Association were doing in connection with it, which was attracting attention all over the world. He said it seemed to him to be perfectly practicable to erect small experimental works at Ann Arbor to help on the investigation. This remark brought up, at the suggestion of the President, Mr. Douglas, the Manager of the gas-works in the town, who stated that after the last meeting it was proposed to erect such a plant as Mr. Knight had suggested; and, through the courtesy of a number of gentlemen, the apparatus was all promised. The idea was to put up a bench with a single retort and a condensing system—in other words, a miniature plant. But, after going into it and attempting to design it, they found it was a very difficult thing to do. Actual working conditions probably could not be obtained with a single retort, the expense of operating it would be large, and the time required in the actual bringing up of the heats, &c., would be a serious obstacle. So it was decided that it would be better to connect the condensing plant with a single retort, or with two or three retorts, in the works. The matter had been talked over, and he thought the apparatus had all been promised. The plan was to build a small structure at the side of the retort-house, so as to connect one retort of the bench with the condensing apparatus, and put in a small condenser, exhauster, and purifier. The condenser was so arranged that samples of gas could be taken at any point, and any part could be cut out, so that the condition of each section of the condensing and purifying apparatus could be changed whenever desired.

The next speaker was Mr. M'Kee, who remarked that one of the points made in the paper was the building of a very small tar-separator, in which it was proposed to prevent contact of the gas with the tar. In the diagram given, the separator was a small drum carrying vanes. It was not mentioned whether these vanes were on the inside or the outside of the drum. Assuming they were on the outside, each cubic foot of gas, when the drum was rotating at 1300 revolutions per minute, would be scrubbed over approximately 3000 square inches of tar. It seemed to him, instead of being an apparatus to prevent the scrubbing action, it was about the most efficient device that could be designed to permit it. Assuming, on the other hand, that the vanes were inside the drum, and that a system of vortex currents would be set up through which the gas would descend through the outer part of the drum to the bottom in the clearance space, and return up the centre, a scrubbing action would go on just the same, though probably not to so great an extent as it would if the vanes were on the outside. In regard to the errors in sampling, he remembered that last winter a gentleman at Ann Arbor had a large chart for them to look over, made at Detroit, of samples of tar from the Pelouze and Audouin separator. In the results, there were a very large number of inconsistencies which apparently could not be explained; and he believed that Professor White and he had spent half-a-day endeavouring to ascertain the reason of these things happening. It was pointed out, in the course of the afternoon, that it was probably due to sampling. He did not think that in the paper enough stress had been laid on the errors due to sampling. It had been pointed out in one of the technical publications that, in the case of gas travelling through a pipe, the outside 3 or 4 inches—depending on its size—was moving in vortexed rings, in somewhat the way they had seen smoke rolling; in other words, that the gas in the middle of the main was travelling on roller bearings, so to speak. It was natural that the gas on the outside should be scrubbed against the tar deposited on the wall of the main; and the gas in the middle of a 24-inch main was travelling very rapidly—in the Detroit works probably at the rate of 6 feet per second. The authors, in taking their samples, put the tube just inside the main, and evidently got the sample of gas where the rolling movement was going on. They attempted, in another part of the paper, to make a comparison between the amount of tar at the outside of the main and in the middle. To take the sample at the latter place, they simply screwed the pipe in so that its end was directly in the current of gas. If the members considered, from a mathematical standpoint, just what happened when they attempted to take this sample from the middle of the main, they had a rate of flow in the $\frac{3}{4}$-inch pipe of 20 feet per minute, while in the centre of the main it was probably from 5 to 8 feet per second, depending on the time after charging. The heavy particles of tar, moving so much faster in the main than they did in the sampling-tube, would rush by; whereas the gas alone would be drawn in the sampling tube. That was to say, the amount of tar estimated from the centre of the main would be much lower than it should be. It seemed to him that the only accurate way of estimating the amount of tar in the centre of the main was to put the inlet of the tube parallel to the direction in which the gas was flowing, and directly facing it, and then arrange for the rate of flow in the sampling-tube to be equal to the rate of flow in the main. If this were done, the gas, tar, and all would follow right into the tube. Otherwise he did not see how they could get an even approximate sample. He thought the points brought out in regard to sampling covered the tar question very thoroughly, and showed that it had been almost impossible to get even an approximate sample, or to draw any fairly approximate conclusions from the results that had been worked out in regard to the tar question. So far as naphthalene was concerned, he believed the authors stated that the results could be relied upon as being accurate; but he wished to take just one exception—that the naphthalene was given off at the latter part of the burning off of the coal, probably during the last two hours before the charge. In the tests taken, it was not specified clearly when the sample was drawn off. It might have been done just after the charge was put in or during the last half or the middle half, which, it seemed to him, would vary considerably the amount of naphthalene. He appreciated thoroughly the amount of work that had been done, and he believed they were moving in the direction of truth. But the advisability of attempting to sample a fraction of gas from a large main had, he thought, been gone into very thoroughly in England; and therefore it would be advisable to look carefully into the literature of the matter before making any attempt to set up an apparatus or commencing next year's work.

Mr. Blauvelt, referring to the statement in the paper that the authors had tried pitch, and, as an extreme case, a hard and brittle sample was chosen, pointed out that "hard" and "brittle" were relative terms with regard to pitch; and he thought it would be a matter of great interest to all to know what was the melting-point of the pitch, and whether it was so high that, under the conditions of the test when the gas entered at various degrees (122°, 156°, and 194° Fahr.), at that temperature there was any melting of the pitch used in the test-tube, or even whether any softening and tendency to run together manifested itself. If the pitch were so hard that nothing of this sort occurred, did it not indicate that the use of a sort of a pitch-filter, if he might use the expression, made up of hard and brittle material, ground and laid on trays, would be a much better device for the removal of naphthalene than the pumping of the dead oil of tar, which already contained considerable naphthalene, such as was used in some European works.

In answer to this question, Professor White said that he had not the exact melting-point of the pitch, but it softened in every case, so that it had to be broken out of the tube. It would not shake out after it had been heated up and mixed with sand; and he did not think a pitch that was entirely hard would have acted to the same extent as that which was melted soft, although they might have had the action of free carbon pitch which would not have been masked by the amount of hydrocarbon incorporated with it. Referring to the remarks of Mr. M'Kee, he (Professor White) thought he had set forth the difficulties experienced in operating in the gas-works more vividly than they were stated in the paper; but they had all been appreciated by the authors. They had to work under existing conditions; the only thing to do was to get the best results they could with the means at hand. This they did to the best of their ability, and they had refrained from going too much into an explanation of a good many figures, because they had no explanation to give. They could simply say there was, in all probability, an error in sampling to account for it. This was the most they could say. They believed, and hoped, when they came to working with the experimental plant, that they would be able to control these variables to such a degree as to permit them to reach conclusions where at present things seemed to be very much tangled. There was not much doubt that the proper way to take out naphthalene was to get it into the tar, and then remove the latter. He believed the tar removal could be accomplished if it were known to be desirable; but the question of determining how to get the naphthalene into it was a more difficult one to solve, because they knew it was a product or function of at least three variables—time, temperature, and surface—and any change made in the works would involve a change in all three variables. In his mind, the opinion of one man was about as good as that of another as to which of these three, or whether all of them, had been concerned in the result. The great difficulty about the whole thing was that there were so many variables which they could not control. They could control nearly all of them through an experimental plant; and he felt greatly pleased, as they all did at the University, at the compliment which had been paid to the work done by the Association from year to year in its support of the fellowship.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Foleshill (Coventry) Gas-Works.

The November fixture of the Midland Junior Gas Engineering Association took to the form of a visit (arranged by kind permission of the Engineer, Mr. Fletcher W. Stevenson) to the new gas-works of the Coventry Corporation which are being erected at Foleshill—about 3 miles from the centre of the city—and this was carried out, under absolutely perfect weather conditions, on Saturday afternoon. The sixty or more members who constituted the party (the majority of whom had travelled together from Birmingham), on arriving at Coventry, boarded a reserved tramcar which was waiting outside the station, and were taken by this through the city to the gates of the Foleshill works. Here they were welcomed by Mr. Fletcher Stevenson; and a prompt start was made with the inspection. The members were divided up into several groups, which were taken charge of by Mr. Stevenson himself, Mr. F. H. Stevenson, Mr. P. Langford, and Mr. Linnell—all of whom were, needless to say, unceasing in their desire to impart information and to satisfy the keen inquiries of their visitors. Future plans were fully explained; and the parts which are already completed and in use—the water-gas buildings and apparatus, the two four-lift holders, and the chemical works—were thoroughly inspected.

In the "JOURNAL" for May 8 there appeared a plan of the works, and a description of the scheme of development. It may be pointed out here that the site is nearly 40 acres in extent, and that the present project is for a gas-works of a daily productive capacity of $3\frac{1}{2}$ and $1\frac{1}{4}$ million cubic feet of coal and water gas respectively, and of a storage capacity of $3\frac{1}{2}$ million cubic feet (with provision for extensions so as to give an ultimate daily capacity, productive and storage, of 15 to 16 million cubic feet), as well as for sulphate of ammonia and sulphuric acid works. The coal-gas buildings and plant are in course of construction; but, as already mentioned, the water-gas apparatus, gasholders, and chemical works are already in use. On the completion of the first section of the new works, the manufacture of gas will be discontinued at the old station in the city, which will eventually be used only for purposes of storage and distribution.

On the different parties re-assembling at the gates of the works, a tramcar was again requisitioned to convey them to the King's Head Hotel, where Mr. Stevenson hospitably entertained the members to a meat tea. At the conclusion of this,

Mr. S. T. SMITH (Walsall), in the unavoidable absence of the President of the Association—Mr. G. W. G. Tatam—proposed a hearty vote of thanks to Mr. Stevenson for allowing them to go over the Foleshill works, and also for giving up his Saturday afternoon to accompany them, in order to explain what had been done and what was to be done in the future. In this vote of thanks, they must, of course, not forget to include Mr. Stevenson's Assistants, for the information they had given them. These gentlemen had likewise given up a Saturday afternoon for the sake of the members of the Association. They would also wish, through Mr. Stevenson, to thank the Gas Committee of the Corporation. If the members had paid any attention to what they had seen and heard, they would carry away in their minds details which would be most useful to them in after-life. He only hoped they would have a chance to go over the works again when they were completed. Mr. Stevenson had given them food for their brains, and also for their bodies; and for his kindness in both respects, they were greatly indebted to him.

Mr. F. J. BYWATER (Birmingham), in seconding the vote, remarked that he could not add anything to what Mr. Smith had said except his own personal thanks for what he had seen that afternoon. It was a magnificent scheme; and as he himself knew something about setting up new works, he could thoroughly appreciate the immense amount of labour and mental toil that such an undertaking would entail. They, as an Association, wished Mr. Stevenson the success which he (Mr. Bywater) was sure he would have in carrying out his scheme. They had that day been treated with the greatest possible courtesy by Mr. Stevenson and his Assistants. This was encouraging to young men; and they ought to appreciate it.

The vote having been enthusiastically carried,

Mr. STEVENSON, in responding, said that when the Hon. Secretary (Mr. James Hewett) wrote asking if the Association could go over the works, he (Mr. Stevenson) thought they were about a year too soon or a year too late. However, the Secretary seemed to think that the visit would be of interest to the members; and so he was really very pleased to see them. If they had had some pleasure in coming to Coventry, he also had had some in showing them round and discussing the new works; and he was sure he could answer for his Assistants in the same way—that their Saturday afternoon had been very well spent. They in the gas industry worked hard and worked well, not only from a monetary point of view, but because they took an immense interest in the business. The more one had to do, the greater the interest was, and the keener one became over the work. This was his experience; and he was sure that Mr. Bywater would agree that he had never enjoyed himself more than when he was engaged in the new works to which he had referred. He hoped many of those present would in a couple of years' time be in the Senior Association; but those of them who remained in the Junior Association, and others who might come along, he trusted would pay him another visit then, when he thought they would be able to judge better of what was being done.

LONDON AND SOUTHERN JUNIOR ASSOCIATION.

Visit to Messrs. Glover and Main's Works.

The successful opening meeting for the present session of the London and Southern District Junior Gas Association (which was noticed in the "JOURNAL" a fortnight ago), was followed on Thursday last by an equally satisfactory visit to Edmonton—the members having been kindly invited to inspect the Gothic Works of Messrs. Thomas Glover and Co., Limited, and Messrs. R. & A. Main, Limited. The party numbered about forty—which was conclusive evidence of appreciation of the efforts of those who had arranged the outing—more especially when it is remembered that, in order that everything might be seen in operation, the visit was fixed for the middle of the week, rather than for a Saturday afternoon, when the time at any rate of most of the members is their own. Those who attended were amply rewarded, not only by the knowledge of the success they had made of the outing from an Association point of view, but also by the immense amount of enjoyment and information they were able to derive from what they saw. With regard to the latter point, it is, however, not necessary to say any more here; for the meter works of Messrs. Glover, the stove works of Messrs. Main, and the Gas-Meter Testing Station of the Middlesex County Council—all of which were thoroughly inspected—were fully described in the "JOURNAL," with various illustrations, as recently as last month (see p. 32), in connection with the visit of the Eastern Counties Gas Managers' Association. Suffice it to remark that, in small parties, the members were shown round by Mr. Richard T. Glover, Mr. Thomas Glover, jun., Mr. F. J. Beaumont, and other members of the staff, by whom the various processes in operation and the working of the many ingenious machines were explained as fully as the all-too small amount of time at disposal would admit. So engrossing did the inspection prove, that more than one expression of regret was heard that the visit could not extend over a whole week, instead of a single afternoon.

After everything had been seen, the members were the recipients of still further proof of goodwill in the shape of tea and other refreshments. During this portion of the proceedings, the President (Mr. W. Upton) proposed a hearty vote of thanks to their hosts for their hospitality, and for the privilege they had extended to the Association by throwing open their works from end to end for inspection. It was, he remarked, not every day that the members got such an opportunity. This was the first time they had been over a meter works as an Association; and the meter was a most important part of their business. Gas men ought to be very thankful that they possessed—chiefly due to the energy, skill, and inventive faculties of the manufacturers—such a wonderful measuring instrument. When they looked over a works like those, in which the word "Efficiency" was stamped everywhere, and saw the wonderful apparatus that had been designed to reduce costs and ensure accuracy, they appreciated the immense amount of organization and capital outlay that were needed to meet the requirements of the gas man. The inspection had been a revelation to most of the members; and he trusted that later on the Association might have an opportunity of paying another visit to the works. The first visit had just whetted their appetites. They had all seen various things that they would like to see again. Nothing whatever had been kept back from them. Mr. Walter Grafton seconded the proposal, with the remark that everyone had enjoyed the afternoon. The vote was carried with applause; and Mr. Beaumont, in returning thanks, said they would certainly be pleased to see the members again on some future occasion.

Lighting of the New Hall and Buildings at University College, Reading.—From the account of the recent opening of these buildings by the Right Hon. R. B. Haldane, M.P., LL.D., the Secretary of State for War, which appears in a local paper, we learn that the lighting of the hall is by a "thoroughly well-arranged system of electric light, with separate control for the various portions." At the same time the authorities are not confident as to the reliability of the illuminant they have chosen, for it is stated that "a gas-jet is kept alight during the evening use of the building, in case of panic through possible failure of the electric light." In the case of theatre lighting, the London County Council make it obligatory upon the managers that the electric current shall be taken from two separate supplies; but as this was impracticable at Reading, gas is to be depended upon to ensure public safety. This is fully justified by the fact that no one has ever seen, and moreover is not likely to see, an announcement, in the case of a building lighted by gas, that electricity is provided and kept ready to be switched on in case of a failure. It is not a little gratifying to the Reading Gas Company that, with the exception of the large assembly hall, the new buildings are lighted by incandescent gas-burners; those in the Fine Arts Department being grouped so as to produce as nearly as possible the broad effect of daylight.

JUNIOR INSTITUTION OF ENGINEERS.

The Inaugural Meeting of the Institution for the session 1906-7 was held at the Westminster Palace Hotel last Friday; and there was a good attendance. Mr. DUGALD CLERK, M.Inst.C.E. (the Retiring President), occupied the chair at the commencement of the proceedings.

The SECRETARY (Mr. Walter T. Dunn) read the minutes of the previous meeting; and they were confirmed. He subsequently read the names of the new members, since elected; among them being the new President, Mr. W. B. Bryan, M.Inst.C.E., the Chief Engineer of the Metropolitan Water Board.

The CHAIRMAN then announced the award of the Institution Medal to Professor John T. Morris, for his paper on "Electric Mains for Power Transmission Work," to which he referred in appreciative terms—saying it would be useful alike to senior and junior engineers.

A tribute was next paid to the memory of the late Mr. Henry John Young, a Past-Chairman of the Institution, by the unveiling of a preparatory model of a bronze medallion executed by his brother, Mr. A. Stanley Young. The ceremony was performed, with the members standing, by Mr. H. L. Rugg, the Chairman of the Institution for the year, who proposed a vote of thanks to the artist. This was seconded by Mr. Ernest King, an old and personal friend of the deceased, and briefly acknowledged by Mr. Stanley Young.

Mr. F. R. DURHAM (the Vice-Chairman) then proposed a hearty vote of thanks to the Retiring President, and referred in warm terms to his valuable address and to his work for the Institution during his term of office.

Mr. G. P. KNOWLES seconded the motion; and it was cordially adopted.

Mr. CLERK, in acknowledging the vote, said he was touched by the expressions which had been employed in regard to him. He appreciated highly the honour the members had conferred upon him by electing him to fill the chair. He parted from them with regret; but he should nevertheless still be one of their number. He was surprised at the width of their sympathy and the scope of their work, as shown by the variety of papers submitted at their meetings. He then introduced his successor, remarking that the work in which he was engaged was of vital importance to every civilized community.

Mr. BRYAN took the chair, and at once proceeded to deliver his

INAUGURAL ADDRESS.

Having thanked the members for the honour they had done him in electing him President, he said it was not difficult for him to choose "Water Supply" as the subject of his address; his experience having been chiefly in matters appertaining to water and sewerage. He hoped, however, he should be pardoned for treating it in a very broad manner, and without any exact information or interesting diagrams. He then opened his address with some historical particulars, in which he showed that in ancient times important communities had channels or conduits by which water was brought from some river or other source into the towns; the distribution to the inhabitants being principally by manual labour. He went on to say that probably the earliest method of artificially obtaining water was by digging wells; and in the vicinity of the Pyramids some still exist which were in use when these great works were constructed. Important wells were found in Ancient Greece; and there are numerous remains of some in Assyria, Persia, and India. The Chinese were expert well-borers, and depths of 1500 feet and upwards were reached by methods almost identical with those at present in use. An aqueduct built to supply the city of Samos, mentioned by Herodotus, is even now in good preservation. The magnificent works constructed by the Romans are still in evidence; and the remains of the aqueducts in Italy, Spain, the South of France, and elsewhere, testify to the fact that these were among the greatest of their achievements.

Mention of the Romans led the President to give some interesting details of the water supply of their city, which, according to Frontinus, who wrote about 97 A.D., was furnished by nine aqueducts as well as by a number of springs. The first permanent Water Commissioner was M. Agrippa, who kept a private gang of slaves or workmen for the maintenance of the aqueducts and the delivery tanks and basins. He determined how the available water was to be allotted. The testing and stamping of fittings was a practice of the Romans, and therefore is not a modern innovation, as some water-works officials think. Nor was the practice of laying surreptitious branch-pipes. The wages of the men were paid from the State Treasury, the income of which was obtained from the receipt of the water-rentals. A large amount of money was lost through loose management; and the Commissioner was careful to bring it under fixed rules. It thus appears that a great many duties now connected with water undertakings are not altogether dissimilar to those of past times. One thing is quite clear—that there was a considerable amount of fraud in connection with the supply of water, and a great temptation to draw it unlawfully. The supply allowed per head per day was probably about 32 gallons. The laws connected with the acquisition of lands for aqueducts, the settlement of the amount of compensation by an arbitrator, the protection of the waters from pollution, and penalties for illegally taking waters, were singularly like those of to-day. Many provisions similar to those in the Lands Clauses Act and the Water-Works Clauses Act were in operation in Ancient Rome, and have remained in force in Italy to the present time. The fall of Rome brought with it the destruction of the aqueducts and the general neglect of the water supply; but the Popes maintained a service to the city for a long period.

Coming to later times, the President remarked that Paris depended entirely on the Seine until a small aqueduct was constructed in 1183. About sixteen years ago, the supply was some 54 gallons per head per day, of which about 40 gallons were drawn from rivers and used for street washing and other public purposes, while only 14 gallons were drawn from springs and used for domestic requirements. In 1892, an additional quantity of 25 million gallons per day was brought in by means of an aqueduct 63 miles long. Large works for the filtration of river waters have been executed during the past few years, and experimental works on a large scale for the purification of water by means of ozone have been instituted. In Germany, water-works were constructed as early as 1412, and pumps were introduced in Hanover in 1527. Vienna is supplied from springs at the foot of the Styrian Alps, and the aqueduct is 60 miles long. In London, small quantities of spring water were brought to the city as early as 1235 by means of lead pipes and masonry conduits. The first pump was erected on the old London Bridge in 1852, for the purpose of supplying the City through lead pipes. In Great Britain, the principal aqueducts since the construction of the New River, nearly 300 years ago, are modern. The Manchester aqueduct, for bringing water from Thirlmere, is nearly 100 miles in length. Glasgow receives its water from Loch Katrine by an aqueduct 35 miles long; and Liverpool is partly supplied from the River Vyrnwy, in Wales, by an aqueduct 67 miles long. In the United States there are magnificent works for conveying water to New York, Boston, Philadelphia, and other cities.

The President went on to say he had intended making a few remarks on the different methods of raising water in ancient and modern times, but time would not permit. He would content himself with observing that wonderful strides had been made during the last few years in perfecting high-lift centrifugal pumps; and the more experienced makers would now guarantee a very high efficiency. The most popular type of pumping-engine at the present time is the vertical triple-expansion engine, with plunger pumps. These engines have been constructed in great numbers since 1886. In many engines of this class, an efficiency of from 90 to 94 per cent. has been obtained. The cost of a vertical triple-expansion pumping-engine for lifting considerable quantities of water is very great; but the economy in working is highly satisfactory. The cost of a steam-turbine actuating a high-lift centrifugal pump is very small as compared with such an engine as the one just referred to; but, on the other hand, the operating expenses may prove to be greater, and perhaps would more than counterbalance the additional capital outlay. The vertical triple-expansion engine, when in operation, has a great range within which it can work as necessity requires, and this with very little less efficiency. On the other hand, a steam-turbine coupled direct to a high-lift centrifugal pump must run within narrow limits of the same speed so as to secure the very best results. In the case of pumping into a reservoir large enough to compensate for the fluctuations (which are great during the 24 hours), this disadvantage would disappear. The President said he thought that probably the most economical arrangement in constructing a new pumping-station would be a combination of the two—the high-duty vertical triple-expansion engine to be always at work except at such times as when stoppages were necessary for temporary purposes or for overhauling, keeping the turbine pump in reserve to take up the duty when required. In the latter case, the period annually that the pump would work would be small, and any loss of fuel by the less economical working of the engine would be inappreciable as compared with the saving on capital account.

Dealing further with the subject of pumping, the President said that for some years past great progress had been made in the use of internal combustion engines for the purpose. In small installations, the economy effected, as compared with steam, was truly remarkable. In large ones, the difference was not nearly as great. Some tests which had only just come into his hands were, however, very interesting. Two gas-engines, with suction plant, exerting together 138 pump-horse-power, required only 0·64 lb. of anthracite coal per horse-power-hour. One engine actuated a low-level, the other a high-level, set of pumps, the total height of water lifted being 400 feet. Seeing that the work done in water lifted included all friction in the engines, gearing, and pumps, the fuel consumption was, he said, remarkably low.

As Chief Engineer of the Metropolitan Water Board, it was to be expected that the President would offer a few remarks on the present water supply of London. He stated that the area of the limits of supply of the Board may be taken as 537 square miles, and the population as about 6,800,000. The average quantity of water supplied per day in the year ended March 31 last was 218 million gallons, or 32·3 gallons per head for all purposes. In the month of July, 1904, 258 million gallons daily were supplied; in July, 1905, 253 million gallons. The average weight supplied in the former month was equal to 3¼ cwt. per head per day; and the height to which it was raised might be put down at 200 feet.

The gross revenue per ton was about 1¾d. "What else," asked the President, "can be brought many miles, impounded, filtered, and raised 200 feet high, for a 1¾d. a ton?" The aggregate length of iron mains is now about 6000 miles; and the number of filter-beds 147, covering an area of 150 acres. There are 36 pumping-stations and 252 engines. The storage reservoirs have a total capacity of 7415 million gallons, with an acreage of 1309. In addition, there are in use 78 covered reservoirs for filtered water, of a capacity of 243 million gallons. A covered reservoir is at the present time under construction, from the designs of Mr. J. W. Restler, the Engineer of the Southern District, to hold about 58 million gallons. This, it is believed, will be the largest covered reservoir in the world. In July last, the relative proportion of the supplies, amounting to 251 million gallons daily, were obtained as follows: From the Thames, 57·484 per cent.; from the Lea, 16·389 per cent.; from springs and wells, 26·126 per cent.; and from ponds, 0·001 per cent. The quality of the water is examined on behalf of the Local Government Board by Dr. T. E. Thorpe, C.B., F.R.S., and in July 105 samples were taken. On behalf of the Water Board, Dr. Houston, the Director of Water Examinations, during the same month took 989 samples, 277 of which were utilized for chemical and 712 for bacteriological examination. For many years past, Greater London has proved to be the healthiest of the great capitals—due, no doubt, partly to the water supply.

With further reference to the general question of "Water Supply," the President said: One of the most important and difficult matters is that of the daily quantity per head. We hear of the enormous supplies given per head per day in most American cities, and we wonder how such quantities can be legitimately used. We must remember, however, that the Americans use the old wine gallon, and that six American gallons are only equal to five English; but even with this correction the volume distributed is out of all proportion to that used in European cities and towns. I have discussed the question with most of the leading American hydraulic engineers; but, so far, I have not arrived at any satisfactory explanation. In many towns, attempts have been made to check the waste by introducing meters; and from an inspection of a table showing the consumption per head per day, and also the percentage of taps metered, in a large number of towns, it is clear that the consumption decreases as the percentage of taps metered increases. The conditions in this country are quite different from those on the Continent. In Paris, Berlin, Vienna, and other large towns, the number of persons living in one house is from 10 to 14 times as many as in large towns in Great Britain. The water is supplied by meter, and this is under the control of the *concierge*, who is most careful, as a rule, to protect the landlord's interests in the matter of water consumption; hence the moderate consumption for domestic purposes abroad. A hard-and-fast line cannot be drawn as to the daily quantity per inhabitant for domestic purposes. In villages, where there is no water-carriage system of sewerage, from 10 to 12 gallons are ample. In large towns, where the system is only partially used, from 12 to 15 gallons have proved to be sufficient; and I have found 12 to 18 gallons per head per day ample in very populous districts, in which every house has had a water-closet, and where the supply is in no way restricted. In the very best districts, where there are large gardens attached to the houses, and in very many cases stables and coach-houses also, the Deacon meters show a consumption of about 18 gallons per head per day. To give the average consumption per head per day for all purposes in British towns would be somewhat misleading, unless the volume supplied for trade and public purposes were separated from that for purely domestic uses. I have not touched upon the comparative merits of spring and deep-well water or river water, or upon the virtues of soft water as compared with hard, as all these have been debated over and over again; but it is quite obvious that the character of the water supplied, or to be supplied, to towns and villages depends in a great measure upon their geographical and geological positions.

In conclusion, the President called attention to an excellent paper written by Mr. G. H. Hughes, on "Water-Works Construction," and printed in the Transactions of the Institution for 1905, as being well worthy of any water-works engineer's careful perusal; and also to the Inaugural Address of Mr. W. H. Lindley, in 1904, in which would, he said, be found valuable data connected with water-works on the Continent. The amount of time and research he devoted to the getting up of accurate statistics and the preparation of the diagrams accompanying the address must, he said, have been enormous; and he congratulated the Institution on having such high-class and useful information printed and in the hands of all the members.

The address was very cordially received.

Mr. J. W. NISBET, in moving a vote of thanks to the President, said the address had been characterized by modesty, inasmuch as no reference had been made by the President to the works he had carried out. He might specially mention the Blackburn water scheme of 25 years ago, which included the laying of a 30-inch main 24 miles in length, to bring water by gravitation from the hills above Blackburn to the town. However, the members had the gratification of knowing that they had at their head the Chief Engineer of the Metropolitan Water Board, who would, he knew, always be ready to impart information to them.

Mr. G. WHALLEY, in seconding the motion, said the address would be of very great value to the members, who would all appreciate and profit by it.

The motion was cordially supported by Mr. E. B. BARNARD, the Chairman of the Works and Stores Committee, and Mr. A. B. PILLING, the Clerk, of the Metropolitan Water Board, and carried by acclamation.

The PRESIDENT having briefly acknowledged the vote,

The SECRETARY announced that he had received from the President £15 15s. for the Institution and a like amount for the Benevolent Fund; also that the fund would be augmented by a sum of £50, being part of the surplus from the Engineering Exhibition.

The announcement was received with applause.

The PRESIDENT then notified the arrangements for the forthcoming meetings, and the proceedings closed.

The Prevention of Corrupt Practices.

Just before the House rose for the recess, the Royal Assent was given to a short Bill, the object of which is the better prevention of corruption. It consists of practically one clause, under which any agent who corruptly either accepts or bestows a gift or consideration as an inducement or reward for doing or forbearing to do any act in relation to his principal's affairs or business, or if he gives to any agent, and such agent uses, any receipt, account, or other document which contains any statement intended to mislead the principal, he is to be liable to imprisonment, with or without hard labour, for a term not exceeding two years, with the alternative of a fine not exceeding £500, or to both imprisonment and fine, or, on summary conviction, to imprisonment for a term not exceeding four months, with the alternative of a fine not exceeding £50, or to both imprisonment and fine. A person serving any corporation or any municipal borough, county, or district council is an agent within the meaning of the Act. A prosecution for an offence under the Act is not to be instituted without the consent of the Attorney or Solicitor General in England or Ireland. The Act extends to Scotland subject to certain modifications. At a meeting held at the Cannon Street Hotel on Wednesday last, at which representatives of various trades and professions were present, it was decided to form an Association to promote the enforcement of the provisions of the Act, and to bring to the notice of traders and public bodies the requirements of the law, which it is believed will have the effect of minimizing and preventing the evils due to the prevalence of illicit commissions. As the Act comes into force on the 1st of January next, it is proposed to call a public meeting at an early date, when it will be fully explained and the Association started.

In the article on "Modern Gas-Fires and other Heaters" which appeared in the "JOURNAL" for the 18th of September, we described and illustrated the "Wizard" "slot" gas-fire which Messrs. John Wright and Co. have produced for the winter season. They are now bringing under notice another stove which embodies all the special points of the one named, but is smaller, and is offered at a lower figure. It is 16½ inches high and 12¾ inches wide; but its special feature is the width of the fire—viz., 8 inches. This, the makers claim, enables a good, bright fire to be obtained with a consumption of only 12 cubic feet of gas per hour. This stove, which at present is being finished in best black enamel, can, if required, be fitted with a double length of fuel—an arrangement which is favoured by certain gas authorities.

We have received from Messrs. Emmott and Co., Limited, of Manchester and London, the "Mechanical World" Pocket Diary and Year Book for 1907. This is the twentieth year of publication, and the event has been signalized by the resetting of the contents of the book in new type. This afforded an opportunity of thoroughly revising the work and introducing many new features, one of which is a long section on "Gas-Engines," embodying a concise account of the design, construction, and working of this type of internal combustion motor. In other sections, oil-engines and suction gas-producers are dealt with. The book is in all respects what its publishers claim for it—viz., a collection of useful engineering notes, rules, tables, and data. Its convenient size and the diary at the end enhance its utility; while its low price (6d.) brings it within the reach of every engineer's apprentice.

At the final meeting of the Advisory Committee of the Engineering Exhibition, Sir William White, who occupied the chair, announced that the Organizing Managers (Messrs. Smith and Bridges) had written to him stating that, in fulfilment of their undertaking in the initial stages of the exhibition that a certain proportion of the receipts should be available for making grants to the funds of the various benevolent institutions and charitable purposes generally in connection with the engineering industry, they had placed the sum of £500 at the disposal of the Committee, to be distributed as they might consider advisable. It was decided that the amount should be distributed among the various engineering institutions represented on the Advisory Committee, among them being the Institution of Gas Engineers, the Junior Institution of Engineers, the Society of Engineers, and the Institution of Mechanical Engineers. As mentioned elsewhere, the Junior Institution of Engineers have received £50 for their Benevolent Fund.

GAS-ENGINES FOR HIGH-SPEED RAILWAYS.

Among the abstracts given in Vol. CLXV. of the Minutes of Proceedings of the Institution of Civil Engineers, are two relating to the use of gas-engines in the central station of a high-speed inter-urban electric railway. As the choice of gas-engines for such a purpose is something of a novelty, a few particulars concerning the plant may be of interest.

The single-phase electric railway referred to in the communication runs between the towns of Warren and Jamestown, in the State of Ohio, U.S.A. The railway is 22 miles long, besides which there are 9 miles of single track in Warren itself. The speed on through trains is 30 miles an hour, or 19½ miles an hour with stops averaging every 2½ miles. The whole of the power is derived exclusively from gas-engines, of which there are two, of the Westinghouse single-tandem type, each rated at 470 brake-horse-power, though space has been left for a third engine of equal size. Each gas-engine is directly connected to a 260-kilowatt alternator. All the power for the alternating-current line is transmitted at 22,000 volts, which is reduced at the sub-stations to 3300 volts. This is the pressure at which the trolley-line for the single-phase motors is supplied; but auto-transformers reduce it to 550 volts for use within the two towns. Along the route is one stiff gradient, ¾ mile long, of 1 in 14, which, with a necessary stop at the foot of it, causes considerable fluctuation in the power demanded of the plant, and which therefore tests the gas-engines all the more severely. Full particulars of the valve mechanisms of the engines, and of their working, are to be found in the "Electrical World," of New York, Vol. XLVII. (pp. 363-6). A characteristic feature of the gas-engine design is the adherence shown to steam-engine practice. There are valve-chambers at each end of the engine-cylinders for giving vertical access to the inside. Only natural gas is used, of which there is an abundant and cheap supply in the neighbourhood; the cost being about 15 c. (7½d.) per 1000 cubic feet. It is very clean and of practically constant quality. The cylinders are 21 inches in diameter by 30 inches stroke; the normal speed being 150 revolutions per minute. The tandem cylinder arrangement, by which one power impulse is obtained on each forward and backward stroke, gives an equivalent effect on the crank-shaft to that obtained from a single-cylinder double-acting steam-engine. The engines are started in action by means of compressed air. The hours operated per day are eighteen; the average daily gas consumption being 54,000 cubic feet for the inter-urban work, and 89,285 cubic feet for the inter-urban and city load. The cost of fuel per car-hour is given at the equivalent of 7·75d. for the inter-urban, and 3·72d. for the inter-urban and city.

West's Coke-Handling Machinery for Milan.

The Directors of the Compagnie L'Union des Gaz have placed a contract with West's Gas Improvement Company, Limited, for a complete installation of coke-handling machinery for the new retort-house now in course of construction at Bovisa, Milan, to which reference was made in the notice of the Italian Gas Society's meeting in the "JOURNAL" for the 18th of September. Coke-conveyors are to be fixed in front of two separate benches of inclined retorts, each containing eight settings of nines, and the coke is to be delivered, without leaving the horizontal, into coke-skips outside the retort-house. These skips are suspended from, and travel by, electrically driven gear along an overhead track in the coke-yard, where the coke is automatically lowered and deposited at any required point. Each coke-conveyor is to be provided with two overhead travelling skips, one of which is moving while the other is being filled. The whole of the plant inside the retort-house—comprising the new arches, West's regenerator settings and fittings, the coal-handling machinery (in duplicate), and the special charging-machines—is also being carried out by West's Gas Improvement Company.

Plant Cultivation by Artificial Light.—Writing to the "Morning Post" on this subject, Mr. H. de Rothschild says that during a recent visit to Budapest he learned that experiments were being made with the Kitson light, and that extraordinary results had been obtained. In a certain garden in Kobanya, it was noticed that the flowers were much larger and better developed in one part than any other; and investigation showed that these were exposed directly to the rays of the Kitson lamps in use there. He adds that further experiments have confirmed this.

Southern District Association of Gas Engineers and Managers.—The next meeting of the Association will be held at the Hotel Cecil on the 15th inst., under the presidency of Mr. F. W. Cross, the Engineer and Manager of the Lea Bridge Gas Company. According to the programme issued by the Hon. Secretary (Mr. A. F. Browne, of Vauxhall), the business will be of a specially interesting character. It will consist of the election of the President and office-bearers for the ensuing year, the presentation of the final report of the Committee on the results of the naphthalene inquiry which the Association have for some time had in hand, and the reading of two papers—one entitled "Experiments with Vertical and Inclined Retorts," by Mr. G. R. Love, of Guildford; and the other, "Big Makes per Ton," by Mr. James Paterson, of Redhill. "High-tea" will afterwards be served.

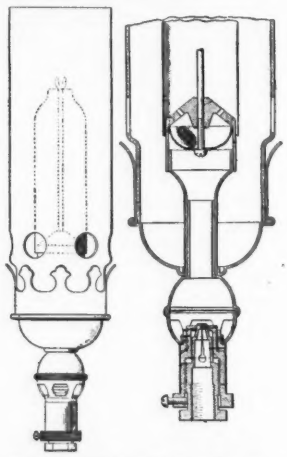
REGISTER OF PATENTS.

Incandescent Gas-Burners.

KENT, T. F., of Newark, New Jersey, U.S.A.

No. 21,828; Oct. 26, 1905.

The objects of this invention are (1) to secure in an incandescent gas-burner improved means for feeding and controlling the gas supply; (2), to enable it to be throttled or reduced without impairing or dissipating its pressure; (3), to limit or regulate the adjustability of the gas supply controlling means; (4), to secure an improved construction of mixing-chamber, especially at its upper or discharge portion; and (5), to thereby secure perfect impingement of the gas against the mantle—resulting in complete incandescence.



Kent's Incandescent Gas-Burner.

As shown, the nozzle connecting to the ordinary gas-pipe supports the entire burner—being at its outer sides (above the wrench-receiving flange) threaded to receive a correspondingly threaded controlling sleeve, having a milled flange at its lower end, so as to facilitate turning. The upper end of the nozzle is reduced and split, terminating in a tapered extremity. The sleeve has at its end an aperture the walls of which flare inwardly, and which is adapted to "fit nicely" on the tapered extremity, close to its end. To reduce the gas supply, the sleeve is screwed downward upon the nozzle, so as to force the two halves of the split tip more closely together and contract the opening at the end, through which alone gas can escape to the mixing-chamber. As this occurs, the gas supply opening is not only contracted, but is brought to occupy within its outside limits a smaller area. There is thus "no diffusion of the gas such as, when the supply is cut down, commonly dissipates the pressure." The pressure remains the same whether the gas supply is large or small in quantity—that is to say, the pressure of the jet passing into the mixing-chamber.

Preferably a set-screw is mounted in the milled flange of the controlling sleeve, to engage at its inner end (if desired) a stop upon the nozzle, and thus limit regulation. Where the day and night pressure in the mains varies considerably, the stop may be of such length circumferentially of the nozzle that its opposite sides determine the position of the controlling sleeve for the different pressures.

The upper portion of the controlling sleeve is preferably reduced and threaded to receive an annular base-piece supporting the mixing-chamber, which has apertures at its base for the admission of air, and above its middle part flares into a cylindrical upper portion, open at its top and adapted to slidably receive a cap provided with a conical top having therein an outer and inner circular series of gas-discharge openings. The outer openings are close to the cylindrical walls of the cap, and parallel thereto; while those of the inner series are inclined outwardly with respect to the length of the mixing-chamber. The mantle sets at its lower end over the cap; being supported at its top by a rod or standard, seated in a central socket of the cap. Thus the gas escaping from the outer series of openings is directed upward—parallel to the walls of the mantle, and in close proximity thereto—while that escaping from the inner row of apertures is directed outward, and also against, the mantle.

Carriers for Tokens used in Prepayment Meters.

COX, G. J., of Melbourne.

No. 23,785; Nov. 18, 1905.

The object of this invention is to facilitate the collection and redistribution of "proprietary tokens" employed as substitutes for bronze coinage commonly used to form an actuating connection between portions of the mechanism of prepayment gas-meters, "whereby the time and labour now occupied in collecting and checking and banking bronze coinage found in such prepayment apparatus may be considerably reduced, and other advantages be obtained."

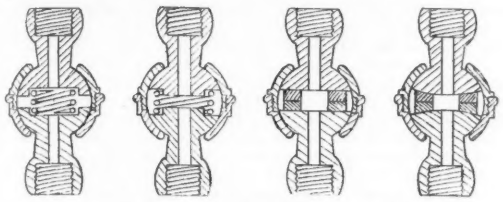
The novelty of the invention consists in forming and applying token carriers, for the use of collectors, formed as long, thin tubular bolts provided with tap-screws and washers; the screw end of the bolts being each provided with a sealing device. Upon the bolt-stems, any predetermined number of perforated tokens provided to act as substitutes for coins may be threaded and sealed direct from the cash or token receptacle of the meters, and be sealed so that each parcel of tokens will be easily transportable, and will readily identify the responsible sealing collector, if necessary; and, further, each sealed parcel of tokens may be dealt with without any other checking as to the value represented.

Ball-Joint for Pipes and Tubes.

MACFIE, D., of Edinburgh.

No. 24,687; Nov. 29, 1905.

In this ball joint, the usual half ball fits in the lower part of the socket, and a further half ball provided on the upper end of the pipe fits in the upper end of the socket. The socket is thus a separate piece, and forms the connection or covering to both half balls. The socket is preferably made (as shown) in two pieces and screwed together. To ensure the close fitting of the half balls to the socket, a shoulder on the flat of each half ball receives a coil spring, so that a pressure is applied to keep both half balls in close contact with the socket.



Macfie's Ball-Joint for Pipes and Tubes.

The shoulder may be of two forms—either with the seats for the spring on the inside with the shoulders near the edges of the flats of the half balls, or on the inner side and near the centre of the flats of the half balls—so that the seats for the spring are of about the full diameter of the half balls.

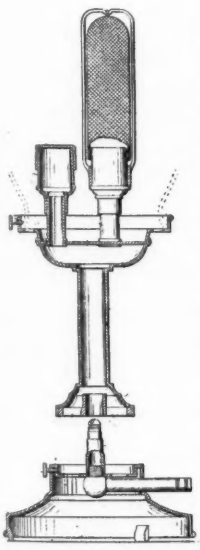
For the coil spring, one or more washers of rubber or other resilient material may be used to form a spring, so as to keep the two half balls in close contact with the socket, with a hole in the centre of the washer for the passage of the gas. Also the seats of the half balls may be made of a partially spherical form, so as to allow of the easy movement of the half balls in the socket without putting undue pressure on the spring washers.

The making of the joint with two half balls in place of one only (as described and shown in the engraving) "allows of much greater flexibility in the joint."

Semi-Portable Gas-Burners.

THOMPSON, W. P.; a communication from the M'LEWEE GAS-LAMP MANUFACTURING COMPANY, of Trenton, New Jersey, U.S.A.

No. 24,623; Nov. 28, 1905.



The M'Lewee Lamp.

The main object of this invention is to make a gas-lamp so that it may be used on a base as a table lamp or readily placed over a gas fixture having an ordinary lava-tip burner, without removing the same from the fixture; a further object being to provide a cap to cover the gas-outlet in case one of a series of mantles should get broken, so that the remaining burners may be used.

The tube A has at its lower end an enlarged portion adapted to be held in the socket formed in the base B by means of set-screws. A gas-pipe extends through the side of the base so that a flexible tube may be attached; and gas is supplied in this way to the lamp. The lava-tip burner attached to the base governs the flow of gas to the lamp. The upper end of the tube A is provided with an expansion chamber C, having a top plate with apertures in it fitted with burner-tubes carrying any number of Welsbach burners. When more than one burner is used in a lamp, a cap D is provided to fit over the burner and so close off the flow of gas in case the mantle is broken—thus permitting the remaining burners to be used.

When used otherwise than as a table lamp, the set-screws are loosened and the lamp lifted from the base, and may be placed on any gas fixture or chandelier having an ordinary burner.

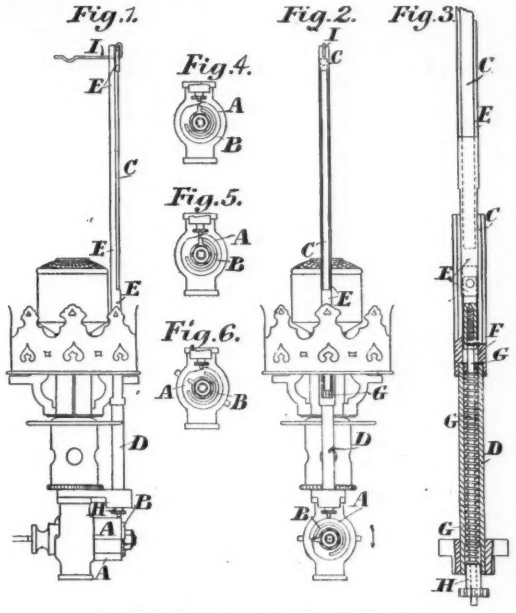
Self-Closing Gas-Burner Taps.

ALBERTIS, C. DE, of Liverpool.

No. 25,056; Dec. 2, 1905.

This invention has reference to thermometric appliances composed of two elements tensioned by a spring, whereby if the flame of a gas-burner be blown out, or goes out from any cause, the tap closes automatically by a spring or weight, and "thus the great cause of accidents due to gas escaping from an unlighted burner is avoided, while permitting the tap to be operated independent of the automatic device." The invention is more particularly applicable to incandescent gas-lamps.

It will be seen that on the burner-plug is a pin which engages with one or other of two stops when it is closed and full open. The barrel A is slipped loosely over the screwed end of the plug and secured by a nut. A spiral spring has one end fitted into a recess drilled for its reception in the body of the cock; while the other end fits into a recess or socket of the barrel. The spring controlled barrel has a tendency to instantly close the cock when it is opened; and thus if the handle of the plug be turned in the direction of the arrow, the barrel will also be turned from its closed position, and against the resistance of the spring by the nib of a plate engaging with the end or stop of a shoulder B, until the pin engages with the stop on the body when the cock is fully opened. If, however, it is desired to close the cock by hand, wholly or in part, when the barrel A is locked, this may be effected by turning the handle of the cock itself.



De Albertis' Self-Closing Gas-Burner Tap.

C represents a fire-clay or analogous rod fitting into a socket in the upper part of a brass holder, which, in turn, is secured to the sleeve D—the lower end fitting into a bridge by means of which the thermometric devices referred to below, as a whole, are supported adjacent to the flame.

E is an expansion strip—say, of German silver—partially surrounding the rod C, and secured to a rectangular brass block fitting within the rectangular cavity F. G is a steel rod screwed into the block and encircled by a spiral spring disposed in a sleeve between the upper plug and the lower cylindrical part, which latter fits tightly on the rod G, and is provided with a toothed or serrated ring at its lower part, by the rotation of which the rod G may be raised or lowered—*i.e.*, adjusted in relation to the barrel A—as desired. I represents a platinoid rod from which the mantle is suspended.

In use, assuming the cock to be closed as shown, it is rotated against the resistance of a spring, until the parts assume the position shown in fig. 4. A light is now applied to the burner (the user still holding the cock open), whereupon the German silver strip E, being heated, expands, and causes, through its connection with the rod G, the end of the rod to almost instantaneously move down and hold the cock open, as shown in fig. 5. The cock may, however, be partially or entirely closed by hand (fig. 6) during the time the end is in engagement with the barrel A.

When, due to any cause, the light is extinguished, the strip E, in cooling, contracts, and the point of the rod G moves upwards, and the cock, being released, flies back to its closed position under the influence of the spring.

Purifier Grids or Hurdles.

CHANDLER, S. & J., of Victoria Street, and MULLINS, E. M., of Stockwell.

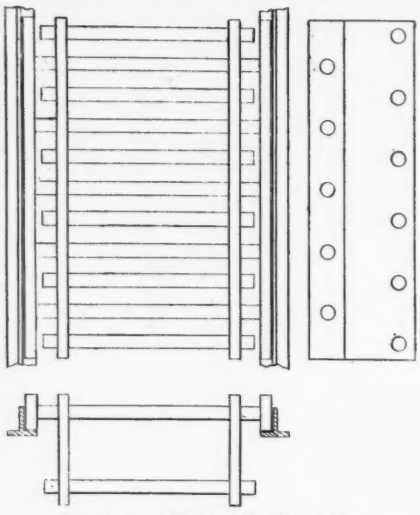
No. 344; Jan. 5, 1906.

The inventors employ for each grid two cheek boards measuring (say) 3 feet long, 1 foot wide, and 1 inch thick (p. 394). Near the top and bottom edges, round holes, about 6 inches apart, are so arranged that the top holes come immediately over the centre and between the bottom holes. Into and through these holes round bars are fixed, allowing the top row of bars to project about 6 inches through each cheek board, while the bottom row of bars, being about 4 inches shorter, project only about 4 inches through—thus forming a double grid. Both top and bottom rows of bars are fixed to the cheek boards in this position.

In fitting the grids or hurdles into the purifier boxes, an ordinary grid would be placed in the bottom as usual. In order to leave space for the proper distribution of the incoming gas between the grid and the bottom of the purifier, the first tier of T-iron supporting bars would be put in—stretching from side by side—web uppermost. The first layer or tier of the "improved" grid would then be placed in the box; the ends of the longer round bars resting upon the T-iron supporting bars. The lower or bottom round bars, being shorter, would pass down between the T-iron supporting bars, and be held in suspension in position by the cheek boards. The same method would apply to each succeeding tier of grids—supported so that there would be a space of about 3 inches between the bottom bars and the top side of the tier of grids beneath it.

The purifying material would (it is said) be "loosely" supported without consolidation; and consequently the back-pressure would be reduced.

The patentees say: "It will be understood that there will be between each tier of grids a layer of the purifying material which is quite unbroken by the presence of supporting woodwork, and consequently there is no possibility of the gas passing unpurified in its passage either



Chandler and Mullins' Purifier Grid.

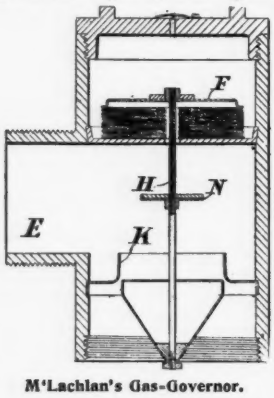
up or down through the purifier box by what is known as creeping, up the sides of the grids or hurdles, as the gas must pass through the unbroken layer of purifying material formed between each successive tier of grids."

Gas-Governors.

M'LACHLAN, R. W., of Enfield.

No. 463; Jan. 8, 1906.

This gas-governor consists of a bellows made up of a number of plain, round plates, fixed together at their inner and outer edges, and with a comparatively small hole in the centre of each plate. It will, it is said, resist any pressure, high or low, according to the number of sections used in building up the bellows. The bottom section of the bellows is attached to a platform constructed of stout tinned plate securely fixed in the part of the body which extends over the outlet E. The top section of the bellows is fixed to a cover F, through which the rod H is passed and fixed with a screw. At the lower end of the rod is a hollow cone K (the size of which would vary according to the size of pipe used), weighted for the purpose of keeping the rod always perpendicular. The cone rises or falls as the bellows are affected by the varying pressure of gas.



M'Lachlan's Gas-Governor.

For the protection of the bellows against undue pressure, a protecting plate N, covered on its upper side with sheet rubber, is fixed on the rod H, thereby preventing the cone from rising to a point that would overstrain the bellows, at the same time allowing the undue pressure to pass freely through the cone.

Purification of Gas.

BURSCHELL, E., of Landau, Bavaria.

No. 11,133; May 12, 1906.

This invention relates to the removal of sulphuretted hydrogen from gas for illuminating, heating, and power purposes.

The patentee remarks that attempts have been made to employ solutions of iron salts for the purpose, by making use of the ammonia contained in the gases, by which the iron salts are decomposed and sulphide of iron is formed from the precipitated ferric hydrate. In the fluid there are thus formed ammoniacal salts and a precipitate of sulphide of iron. Though the latter can again be oxidized, the ferric hydrate formed is no longer soluble in the fluid. A method of purifying coal gas is also known, he points out, in which the gas is passed through apparatus containing a semi-fluid mixture of ferric oxide and ammoniacal liquor; and it has also been proposed to effect the removal of sulphuretted hydrogen by using a ferric oxide purifier rendered alkaline with ammoniacal liquor, and a process has been made known in which an acid solution is used and sulphur eliminated directly. These methods, however, have not been generally applied on account of technical and practical disadvantages.

The object of the present invention is to remove sulphuretted hydrogen from gases by means of a fluid, in order to avoid the drawbacks of the dry process—working in an alkaline solution, and sulphur being only formed by the oxidation of sulphide of iron.

It is known that ferric salts can be reduced to ferrous salts by sulphuretted hydrogen according to the formula: $Fe_2Cl_6 + H_2S = 2FeCl_2 + 2HCl + S$. If the gases containing sulphuretted hydrogen are led through aqueous solutions of ferric salts, only a slight decomposition (according to the above formula) takes place, as the acid formed impedes the reaction, and a formation of sulphide of iron—the same as by the dry process—cannot take place on account of the chemical affinity.

The fact has now been observed that sulphide of iron is formed if the ferric salts are not used in a neutral but in an alkaline solution. It is known that neutral solutions of ferric salts lose their property of being precipitated by alkali if they are mixed with certain non-volatile organic substances—for instance, tartaric acid, sugar. By this admixture, however, their property of being precipitated by sulphuretted hydrogen, after caustic alkali or alkaline carbonate has been added, is not destroyed. The essential feature of the present invention therefore consists in applying these known facts to the purification of gas.

For carrying out the process, an alkaline solution of ferric oxide is formed by adding ferric oxide or ferric salts to a solution of caustic alkali, alkaline carbonate, or ammonia containing tartaric acid, sugar, or other organic substances, which have the effect of rendering the ferric oxide soluble in the alkali. This solution is used for washing the gas in some form of washing apparatus. If, for instance, 3 parts of tartaric alkali are dissolved in 100 parts of water, and if an excess of ferric hydroxide is added, there takes place in the first instance a partial solution of the ferric oxide, and, after the dissolved part has been precipitated by the sulphuretted hydrogen of the gas, fresh quantities are dissolved. The process is repeated as long as there is ferric hydroxide, and gas containing sulphuretted hydrogen is admitted. The precipitated sulphide of iron is easily oxidized when it comes into contact with the air. In this process sulphur is eliminated and ferric hydrate formed; the latter being soluble in the washing fluid.

The presence of ammonia in the gas to be purified does not interfere with the process; so that it can be applied before or after removing the ammonia.

APPLICATIONS FOR LETTERS PATENT.

948A.—MATHER and PLATT, LTD., and CHORLTON, A. E. L., "Internal combustion engines." Oct. 25.
23,363.—HALL, C., "Gas-engine valve." Oct. 22.
23,383.—BAIN, W., "Acetylene lighting." Oct. 22.
23,401.—MARKS, E. C. R., "Lighting and extinguishing gas-lamps." A communication from T. Debenham. Oct. 22.
23,407.—BONTHORNE, J., "Producing combustible gas for industrial purposes." Oct. 22.
23,421.—KRAMER, E., "Incandescent railway gas-lamps." Oct. 22.
23,436.—GLOVER, T., "Anti-vibrator." Oct. 22.
23,501.—BURGE, E., "Gas saver." Oct. 23.
23,529.—HARRISON, C. W., and NOAD, A.C., "Gas-regulating devices for bunsen burners." Oct. 23.
23,542.—ROBIN, J. I., "Mantles." Oct. 23.
23,554.—REISS, C., "Regulating gas-nozzles." Oct. 23.
23,579.—WARD, F., "Mantle holder." Oct 24.
23,604.—MAIN, R. B. & A. C., "Gas grilling and boiling apparatus." Oct. 24.
23,610.—WOLFENDEN, E., "Reflector for gas-lights." Oct. 24.
23,658.—STEINICKE, G., "Glass fitting for gas." Oct. 24.
23,688.—CLOUDSLEY, J. L., "Gas-meters." Oct. 24.
23,693.—PERCY, J. A., "Bunsen protector." Oct. 25.
23,721.—MANIFOLD, A. G., "Mantle-rod supports." Oct. 25.
23,722.—WYBORN, W. E., "Incandescent gas-kettle." Oct. 25.
23,759.—EDWARDS, A. N., and the PNEUMATIC GAS LIGHTING COMPANY, LTD., "Controlling a conduit for gas or other fluid." Oct. 25.
23,799.—JAMES PROCTOR, LTD., and PROCTOR, J. W., "Coal-elevators." Oct. 26.
23,804.—HELPS, G., "Inverted gas lamps and burners." Oct. 26.
23,812.—BARRETT, F., and WHITE, G., "Incandescent burners." Oct. 26.
23,868.—BARANOVITS, G., and LOSSINSZKY, I., "Burners." Oct. 26.
23,905.—RYAN, T., "Utilization of lime-kiln products, gaseous and solid." Oct. 26.
23,909.—TILKE, T. W., "Acetylene-generator." Oct. 27.
23,926.—COOPER, J., and YOUNG, W., "Gas-fittings." Oct. 27.
23,950.—NEMEROVSKY, F., "Incandescent mantles." Oct. 27.
23,969.—HARRISON, C. W., "Incandescent lamps." Oct. 27.
23,991.—BUSCH, R., "Carburetted air." Oct. 27.

Gas Smells at Oldham.

Attention has again been called in the Oldham Town Council to the quality of the gas supplied to Hollingwood, Failsworth, and Chadderton, and to the "bad smells" caused by the manufacture of water gas at the Hollinwood works. In reply, the Chairman of the Gas Committee (Alderman Harrison) said that the Engineer (Mr. Tim Duxbury) had tried to discover the cause of the smells, which were said to arise from the water-gas manufacture. The smells, however, he found, were complained of when the plant was not working. He was aware many complaints were also made of faulty lighting, which some people put down to the bad quality of the gas; but it had been clearly proved that the defect was due to the service-pipes being interfered with by naphthalene. Oldham was not alone in this matter; for other towns complained of the same trouble. During the past few days, the Committee had obtained two Holmes washers, which would be fixed at Hollinwood and Higgingshaw; and he hoped they would improve matters. He did not like to hear people complaining about nothing being done, when the Committee were doing everything possible to remedy the nuisance.

A Fatal Gas Escape at Manchester.—Mrs. Sarah Hutchinson met with her death a few days ago, through turning the gas off at the jet in her bedroom, and then accidentally turning the tap on again. At the inquest, her husband said the tap worked very easily; and a mistake in leaving the gas on might very easily occur. The medical evidence showed that death was due to coal gas poisoning; and the Jury returned an open verdict.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by Correspondents.]

Special Purposes Fund of the Institution of Gas Engineers.

SIR,—So you want to do a little "black-listing" by publishing the names of the companies and corporations who have subscribed to the Special Purposes Research Fund of the Institution of Gas Engineers, and thus inferentially holding up the rest to opprobrium for their illiberality. Well, I will begin the black-list by giving the names of two Companies that have not subscribed, and will also give the reason why, and, further, will make a suggestion. The South Metropolitan and the South Suburban Companies did not subscribe because nothing really definite was put forth as the object towards which the subscriptions were to be devoted; and I confess I doubt whether the Council is the body to undertake useful work in the direction indicated. I heard indirectly last week that they had been considering what to do with the money; but it appeared they had come to no conclusion, at which no one can be surprised. Of course, they will spend the money on something; for if not, the subscriptions will not be repeated, nor will they unless the subscribers are satisfied that they have been usefully expended.

I believe gas companies and committees of corporation gas-works are willing, or some of them at any rate, to subscribe for useful objects; for although I am like the unjust steward in that I am ashamed to beg, I have twice taken part in appeals which met with a liberal and sufficient response both from gas boards and gas committees. The first was for a guarantee fund for the Gas Exhibition of 1882, and the second was for a similar fund to settle the Welsbach law suits, which gave us free trade in mantles and from which the British gas industry has benefited greatly during the last five years. Thus it is clear that subscriptions can be obtained for useful purposes.

Now for the suggestion. The University of Leeds has established professorships for the investigation of problems relating to certain special trades of the district—such as dyeing, tanning, textiles, &c. They have recently appointed Dr. Bone, F.R.S., to a new professorship for Fuel, which, of course, includes gas; and I would suggest, for the consideration of the gas industry, that it would be a wise and proper thing to raise £500 a year for the support of this professorship—the Gas Committee of Leeds doing their part, of course.

There is a good example for such action in the American Gas Association, which supports a similar professorship in the University of Michigan with useful and satisfactory results to the gas industry.

Reigate, Nov. 1, 1906. GEORGE LIVESEY.

[An Editorial reference to the above letter appears on p. 369.]

Pressure Igniting and Extinguishing Devices and the Synchronizing of Clocks.

SIR,—In answer to the question made in your Editorial Notes last week, I do not think there are many places where an increase of 12-10ths on the low pressure worked at three o'clock in the morning would affect the street lighting and extinguishing devices which are also actuated by an increase of pressure. Lamps are usually lighted when the full pressure is on, and is done by an increase on the maximum pressure; and they have to be extinguished at the same pressure. The maximum pressure worked is generally considerably more than 12-10ths above the pressure worked at three a.m. It would be very easy to fix an additional blank notch in Dr. Rostin's apparatus, if it were found that they worked at the pressure necessary to synchronize the clocks.

Leamington Spa, Nov. 1, 1906. THOMAS BERRIDGE.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Thursday, Oct. 25.

(*Before Mr. Justice* BIGHAM.)

Damage to Water-Pipes by Colliery Workings.

To-day his Lordship heard a case in which the Durham Rural District Council claimed from the North Brancepeth Coal Company the cost of repairing damage to the highway caused by an interference with its surface. The Company, it was stated, had won coal under the highway, and the water-mains belonging to the Weardale and Shildon Water Company becoming dislocated, the water escaped, and flooded the subsoil of the roadway. The question at issue was whether or not the Coal Company were liable.

Mr. MACPHERSON briefly opened the case for the plaintiffs, and submitted that the Coal Company were liable for direct injury to the surface of the highway, the rights of which were vested in the Council.

Mr. MANISTY, for the defence, said there were questions of fact as well as of law to be decided, and they were arguing the case on the assumption that damage had been caused to the highway by the bursting of the pipes, which had become dislocated as a consequence of mineral working. The question was of great importance, not because of the amount in dispute, but because the mains extended for nearly 100 miles in the county; and if the contention of the Council was correct, it followed that the rights of the owner of the mineral to work the coal would be largely reduced. In the present instance, as required by section 22 of the Water-Works Clauses Act, 1847, the Coal Company gave the Water Company 30 days' notice of their intention to work the minerals under the mains. By the same section, if the Water Company, after notice, did not acquire right to support, then, under section 23, the owner was entitled to work the coal, and it would be a lawful working. The owner left in 30 per cent. for the support of the road; but for the support of the mains it was necessary to leave 50 per cent. The Water Company had not acquired the right of support as between 30 and 50 per cent.; and the Coal Company had lawfully removed the mineral. The damage to the surface was caused solely by the escape of water from the broken pipes.

Justice BIGHAM: I suppose there would be nothing in this point, if the damage was not due to the broken pipes.

Mr. MANISTY said that if the damage was due to subsidence of the surface by mineral working, then probably an action would lie. If the damage was caused, not by subsidence, but by the dislocation of the pipes, then the Coal Company, he submitted, were not liable, because the Water Company had not acquired the right of support for their mains. The question was, What was the defendants' duty to the highway authority, who had no proprietary rights in the highway?

Justice BIGHAM: They have the right to the user of the surface. They are the trustees of the public; and if you interfere with that right, there must be some remedy.

Mr. MANISTY said the Coal Company had not taken away the percentage of the coal which was necessary for the support of the surface. His clients' case was that, having given notice to the Water Company, they had lawfully worked the mineral, and that the damage was caused by the Water Company having brought the water to the spot by artificial means, and had failed to acquire a right to proper support for their pipes. Another defence was that the damage to the surface was caused by over-pressure in the mains.

Justice BIGHAM said he had not seen this point raised in the case; but the pleadings were sufficiently wide to cover it. If it were shown that the damage was due to the carelessness of the Water Company, the Coal Company would not be liable. It would be only fair to the plaintiffs, however, that particulars should be given to them as to this point of the defence, if the case went to trial.

Mr. MANISTY said the case would go to trial on the facts.

Justice BIGHAM, in giving judgment, said it appeared that in 1879-80 the Water Company laid their mains under the highway, which was owned, if he might use the expression, by the plaintiffs in the sense that they were entitled to the uninterrupted enjoyment of the surface of the land for the purposes of a highway. Five years after the pipes were laid, the defendant Company obtained a lease from the Ecclesiastical Commissioners, for a term of 25 years, of the mines and minerals underneath the highway and lands adjoining. In 1901 or later, the defendants took away the coal from underneath the highway, and thereby, as he understood, let down the pipes and caused the road to be flooded, so that the enjoyment of the surface was interfered with. *Primâ facie*, any interference by a stranger with the user of the surface of the highway was a wrongful act, and the interference due to the removal of the support would in this case be one. The question was, Could it be justified? Defendants said, as against the Water Company, that they were entitled to take away the coal, which had operated to support the pipes, because, after due notice, the Company had not paid compensation for coal to be left for the support of the pipes. In this contention Mr. Manisty was probably right; but the Water-Works Clauses Act, 1847, under which notice was given to the Water Company, had no reference whatever to the rights of the highway authority. The Act referred to regulated the relations between the Water Company and the owners of the mines who were about to remove minerals. It did not in any way affect the rights of other parties. That being so, he must give judgment for the plaintiffs on the point that he understood to be raised. He must add, however, that when the case came to be tried, it might fairly be that the point he had decided was not the point in the case at all, and he did not desire by his decision to fetter the learned Judge before whom the case was to be tried.

An Account for Coal.

The action in the Court of Session by Mr. Archibald Mackay, Gas Coal Merchant, of Edinburgh, against the Nairn Gaslight Company, Limited, reported in our issue of the 23rd ult. (p. 256), came before Lord Ardwall again last Wednesday, when Counsel for the parties stated that the case had been settled, and a joint minute was lodged granting defenders absolvitor. We understand the defenders have paid to the pursuer the full sum sued for, with interest and expenses of process. When the case was in the roll for adjustment of the record, Lord Ardwall expressed the opinion that no relevant defence had been stated.

Stealing Coal from the Taunton Gas Company.

Albert Wood, a haulier, was last week charged at the Taunton Borough Petty Sessions with having stolen 30 lbs. weight of coal, value 3d., the property of the Taunton Gaslight and Coke Company. It was stated by Mr. A. Channing, who prosecuted, that defendant was engaged in hauling coal from the railway station to the gas-works. It was noticed on a certain day that he did not weigh the last waggon load of coal on leaving the railway yard; and, upon coal being missed, he said it had been given to him by a man named Cridland, who, however, denied having done so. Defendant's house was searched; and the coal, which was of a peculiar sort, not used by anyone else in the town, was discovered. Defendant thereupon admitted taking ½ cwt. or 1 cwt. The matter was a serious one for the Company, as they had reason to believe that extensive pilfering had been going on for some time. It was easy for a man to take a small quantity of coal from each truck; and this particular truck was found to be 7 or 8 cwt. short. The police had discovered that the defendant had sold coal in the town. Defendant pleaded guilty. The Mayor (Alderman Vile) said the Magistrates considered there had been a systematic attempt to take small quantities of coal from the railway yard. The defendant had borne a good character hitherto. They therefore adopted the lenient course of fining him 5s., and 17s. 9d. costs.

MISCELLANEOUS NEWS.

PUBLIC LIGHTING OF THE CITY OF LONDON.

The Supersession of Electricity by Gas.

At the Meeting of the Court of Common Council of the City of London last Thursday, the subject of the public lighting, especially in regard to the supersession of electricity by gas in certain streets, gave rise to a long discussion. A report presented by the Streets Committee included the following: "On the reference of May 4, 1905, and submitting a return relative to the cost of incandescent gas lighting in Queen Victoria Street, Fleet Street, and the Monument Street area, showing a saving in the annual lighting bill of £490 10s. 2d., or £119 7s. 10d. more than was estimated, and a saving of £194 1s. 4d. in the estimated cost of the installation." It was intimated also that a copy of this return, which is given below, had been sent to each member of the Corporation.

Mr. DOMONEY, the Chairman of the Committee, said, with regard to the lighting of certain streets, members of the Court would agree that it had been a great success, and he was sure they would also be extremely pleased to find that the amount saved by the Corporation was £490 in the lighting of the part of the City affected, which was more than had been anticipated.

Mr. WALLACE asked if the Committee had had any communication from the City of London Electric Lighting Company, asking to be afforded an opportunity of showing what they could do with regard to improved lighting.

Mr. DOMONEY replied that they had received that morning a communication from the Company, and it had been arranged some days previously to give them a special day. A Sub-Committee had been appointed for the purpose of conferring with the Company; and the meeting would take place on Wednesday next (to-morrow).

Mr. BRINSLEY HARPER said that, so far as the Central Markets Committee were concerned, they liked electric lighting. They had been in negotiation with the Company, who had decided to reduce their terms by 30 per cent.; so that if the Streets Committee had followed the example of the Central Markets Committee, they might have saved £4000 instead of £400. As it was, his Committee had saved 30 per cent. and had a better light, according to what he was told by their Electrical Engineer.

Mr. A. C. MORTON, M.P., said this was a curious statement to make, and remarked that he assumed the last speaker to mean that the estimated saving covered the whole of the City; whereas the saving by the installation of incandescent gas was on two or three streets only. No doubt they would save a great deal more when they had this kind of gas lighting all over the City. But what was much more important was the improved lighting which they had secured; and he was glad to know that the incandescent system they had started had been adopted all over the kingdom, and had been found a success wherever it had been installed.

Mr. DOMONEY also moved the adoption of the following recommendations which appeared in the Streets Committee's report:—

(1) That the City of London Electric Lighting Company be called upon to remove the electric lamp at the corner of Lombard Street and St. Swithin's Lane, and the lamp on the rest opposite Nos. 1-4, Lombard Street; and that high-pressure incandescent gas-lamps be substituted at a cost of about £28—thus effecting a saving on the lighting thereat of about £36 per annum.

(2) That the Company be called upon to remove the electric arc lamp fixed in Adelaide Place, by London Bridge, as unnecessary for public lighting purposes thereat.

(3) That the Company be called upon to remove the electric lamp on the south side of Cannon Street by Budge Row, and that an incandescent gas-lamp be fixed in lieu thereof; also that a resting-place be fixed in the carriageway thereat, with an incandescent gas-lamp, in accordance with plan, at a total estimated cost of about £60.

Mr. R. STAPLEY moved that the recommendations be referred back to the Committee for further consideration. He said he held no brief for, and was not financially interested in, any electric light or

TABLE *showing Cost of Works and Annual Maintenance.*

SITUATION.		WORKS AUTHORIZED.		Estimated Annual Saving.	WORKS CARRIED OUT.			Annual Cost.	Annual Saving.	COST OF WORKS.	
		Displace.	Provide.		Lamps Displaced.	Annual Cost.	Lamps Provided.			As Authorized.	As Carried Out.
				£ s. d.		£ s. d.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Queen Victoria Street . . .	May 4, 1905	30 arcs	34 600 c.p. lamps	224 14 0	29 arcs	754 0 0	46 600 c.p. lamps			1376 5 0	
		2 h.p. gas-lamps	11 900 c.p. lamps	..	2 h.p. gas-lamps	72 0 0					
and		1 "Scott-Snell"	..	..	1 "Scott-Snell"	9 0 0					
						835 0 0					1176 19 6
Queen Street	July 20, 1905	..	..	..	Also 7 ordinary gas-lamps in addition	22 1 0					
			Less— 1 600 c.p. lamp	12 0 0	..	..					
				212 14 0		857 1 0		552 0 0	305 1 0	31 12 6	
Billingsgate area . . . . . (No. 1 contract.)	May 4, 1905	8 arcs	31 300 c.p. lamps	28 11 0	8 arcs	208 0 0	30 300 c.p. lamps	200 5 0		456 0 0	431 12 0
		1 h.p. gas-lamp	1 900 c.p. lamp	18 2 0	1 h.p. 2000 c.p. lamp	36 0 0	1 900 c.p. lamp	18 2 0			
	Nov. 30, 1905	2 ordinary gas-lamps	..	..	2 ordinary gas-lamps	6 6 0				40 0 0	88 6 4
		7 proposed ditto	..	..	7 proposed ditto	22 1 0					
						272 7 0					
					Also 4 ordinary gas-lamps in addition	12 12 0					
				46 13 0		284 19 0		218 7 0	66 12 0		
Ditto . . . . . (No. 2 contract.)	Nov. 30, 1905	2 arcs	8 300 c.p. lamps	(Deficit £1 8s.)	2 arcs	52 0 0	8 300 c.p. lamps	53 8 0	(Deficit £1 8s.)	50 6 0 85 0 0	50 6 0 69 18 2
Fleet Street	May 4, 1905	12 arcs	31 double-burner lamps	..	12 arcs	312 0 0	35 double-burner lamps	..	..	362 12 6	390 12 8
			3 triple-burner ditto	111 15 4	Also 2 ordinary gas-lamps in addition	6 6 0					
						318 6 0		198 0 10	120 5 2		

Estimated saving.	371 2 4		491 18 2	2401 16s.	2207 14 8
Additional saving	119 7 10	Deficit on No. 2 contract as agreed by Court of Common Council .	1 8 0	Saving .	194 1 4
	£490 10 2				£2401 16 0
		Total annual saving in lighting bill	£490 10 2		
		Saving on estimated first cost . . .			£194 1 4

gas company; but he was desirous that the streets should be lighted in the best possible manner. He thought he could make out a good case why the recommendations should be further considered. It had been stated that a great saving had been effected by the substitution of incandescent gas for electric light; but he believed the Chairman of the Streets Committee would bear him out when he said that the Electric Lighting Company had never been afforded an opportunity for discussing the question in any way. They knew that, in the time of the late Colonel Haywood, he (Mr. Stapley) started a movement for establishing the electric light in the City; but the present methods of lighting were a great advance on what they were then. The Gas Companies were now up to date in their lighting, and so were the Electric Light Companies. Why, then, should not the Corporation, in fairness, see which was really the best? He was told the Electric Light Company were prepared to have tests without any expense to the Corporation, to reconsider prices, and go in for the lowest quotation. He failed to see why they should instruct the Company to remove their lamps until they had properly considered the matter, and come to a decision in the full knowledge of which was the best system. He therefore moved, as an amendment, that the recommendations should be sent back to the Streets Committee for further consideration.

Mr. MILLAR WILKINSON said he would second the amendment, because he had always held the idea that the Electric Light Company had never been fairly treated. He knew of an instance where all the gas-lamps had recently been removed, and some very brilliant electric lights, of a perfectly new design, substituted. He thought, therefore, they ought to give the Company every opportunity of showing what they could do.

Mr. MORTON pointed out that the amendment could not very well apply to the second recommendation, because that was a question of removing a lamp which was unnecessary, and therefore the Committee desired to save the money. He did not know why this recommendation should be included in the amendment. Mr. Stapley had suggested that the Electric Light Company had never been asked by the Streets Committee about their methods of lighting. About two years ago both of the Companies were applied to to make the Corporation any offer they pleased. They practically sent word back that they could make no offer, but suggested that the Committee should give them a specification. Then came an offer from one Company about nine months back. They asked the Committee to let them supply the lamps in certain streets. They did not make any offer of a reduction, but indicated or suggested that the figure would be about the same as before. The reduction of 30 per cent. in the Central Markets would never have come about but for the success which had been shown in the gas lighting. If it had not been that the Streets Committee had tried gas lighting, the Central Markets Committee would never have saved the amount stated, because they would never have had the offer of a reduction. As far as he understood from the Streets Committee, they were quite prepared to consider, some months back, an offer from the Electric Light Company. In the meantime, the Company had refused to remove the lamps which were ordered by the Court to be taken down; and the Committee very properly told them they must obey the order before the Court would go into the matter. Up to within the last few days, the Company had refused to remove the lamps on disused refuges, or even in Queen Victoria Street, where the Committee had gas-lamps. The Company had, however, finally taken away the lamps, but only a few days ago. Directly this was done, the Chairman of the Streets Committee arranged a meeting of the Sub-Committee for the purpose of considering the offer of the Company, and also any that might come from the Gaslight and Coke Company. They must not forget that there were two Companies in the City of London. They had heard of only one that day; but he ventured to say—and he believed the Court would agree with him—that if they were going to consider any tests, they would insist upon having some from both Companies, and not from one alone. He reminded them that the Gaslight and Coke Company had really reduced the cost of electric lighting in the City; for without them they would be paying the old prices—as high as 7d. per unit. They knew very well that there had been a fight between the interests of the Electric Light Company and the Gas Company in the City; but the business of the Court was not to consider these two Companies, but only what was the best illuminant for lighting purposes, and whether they could make it pay. The gentlemen came with their electric light, but he was glad to know of the success of gas lighting. He was perfectly contented and happy over the affair, because they had put incandescent gas all over the City, excepting in a few main streets. It had been an eminent success in the side streets, and especially in the courts, of which there were many in the City. They had only to ask the police what they thought of the extra lighting to get testimony of its value. But to attempt to put them back in the darkness or semi-darkness of other days, was not worthy of the Court, whether any of the members were connected with one or the other Company. All he thought of was this—that from the day the Bridges Committee commenced to light the bridges, the example had been followed all over the kingdom.

Mr. WALLACE said Mr. Morton was usually fair; but that day he appeared simply for incandescent gas lighting, and refused to give everybody else an opportunity. (Cries of "No.") Personally, he quite believed in incandescent gas lighting; but he ventured to suggest that it was only fair to the Electric Light Company that the amendment should be adopted.

Mr. DOMONEY said he was rather sorry the debate had taken the course it had done, because if the Court would only look at the thing properly and keep outside both of the Companies concerned, they would see what the recommendations meant. He did not mind taking anything back; but he wanted to show that, even without Mr. Morton, the Committee had been able to do this thing themselves. What was the first recommendation? That the Electric Light Company should be called upon to remove the lamp at the corner of Lombard Street and St. Swithin's Lane and the one on the rest in Lombard Street. I might be within their knowledge that there had been a very fine incandescent gas-light put up outside St. Swithin's Church, and all the Committee asked the Court to do was to give up the side light, and allow them to remove the standard at a very small cost. He was sure they would agree with this. As to the second recommendation, it was very much in the same way. If any of them had seen it, they would recognize that it had nothing whatever to do with what had been mooted in the Court with regard to electric lighting *versus* incandescent gas lighting. He ventured to assure the Court that on the Streets Committee there was no feeling but one of endeavouring to get the best light, whatever it might be, for the City. They were going to meet the electric lighting people, and have a conference with them; but that would be with reference to lighting all over the City. The Electric Light Company asked the Streets Committee some time ago to give them an opportunity of showing what they could do; but before the Committee gave them *carte blanche*, they asked the Company to tell them something about what they proposed to do, the kind of light they proposed to give them, and the streets in which they would like to put it. This they had not yet done. The Streets Committee were in communication with them, and no doubt they would furnish the information. At the same time, he believed the Court would agree that it would be ridiculous for a Committee like the Streets Committee to give any particular company—either a gas company or otherwise—a licence to do exactly as they pleased. For instance, they might propose to give them lights that they had placed on the outside of the Lord Mayor's palace. He did not know what the opinion of the Court would be, but he personally, and the Streets Committee generally, considered that it would be an extremely bad light to have in the streets. He had taken a great deal of trouble, since he had had the honour of occupying the chair of the Committee, to go about the City and endeavour to find out the most suitable means of lighting, to meet the needs of the omnibuses and the traffic and the people who were using the streets; and he had not been able to find any omnibus man who would tell him that the lights outside the Mansion House were not really a source, more or less, of danger. He did not want to go into the question of one light against another, or one might refer to the King's palace, which was now lighted by incandescent gas; but he wished to divest their minds of the idea that the Streets Committee had any feeling in favour of one system of lighting as compared with another. With these few remarks, he hoped the recommendations would be allowed to go forward.

The amendment was then put, and only two or three members voted in its favour. It was accordingly declared lost; and the recommendations were subsequently carried.

THE ASSESSMENT OF THE IPSWICH GAS COMPANY.

Guardians will Appeal.

At the Meeting of the Ipswich Board of Guardians last Thursday, the Assessment Committee reported the result of the Gas Company's appeal to Quarter Sessions in the matter of their assessment (*ante*, p. 255), and recommended that the necessary steps should be taken to appeal to the Divisional Court against the Recorder's decision.

The Chairman (Mr. A. Sizer), referring to remarks that had been made, to the effect that the matter should have been settled by arbitration, pointed out that not only did the Overseers do everything possible to meet the Gas Company, in order to avoid litigation, but the Assessment Committee also proposed that the dispute should be referred to arbitration, and not submitted to Quarter Sessions. It was suggested that the Committee's expert and the expert of the Gas Company should nominate an umpire to settle the question. This offer was made to the Company in writing; and it was refused. A further offer was made to reduce the assessment by £500; and this also was refused. Therefore, the Board had no alternative but to take the case to Quarter Sessions. The result appeared in the report. The annual rateable value had been increased by £120, so that they had gained something. Evidently the Recorder had afforded very little information in his decision. The Committee's Counsel contended that the stoves, slot-meters, and the fixing of them should not form part of the tenant's capital. If so, there should have been no allowance of 17½ per cent. off the tenant's capital. If this was allowed, in about ten years' time they would have little assessable value on the Ipswich Gas-Works at all. No decision had been given on this particular point; and the Assessment Committee had unanimously thought it desirable to recommend to the Board that the case should be taken to the Divisional Court, in order to get a decision upon this point of law. The cost would not exceed £200. Their costs up to the present would amount to something like £1000; and the expenditure of another £200 in getting a decision on the point might be desirable. In fairness, he ought to read the following letter he had received from the Ipswich Ratepayers' Association.

Re Ipswich Gas Company's Appeal.

Our Association have watched with much interest this important rating case, and have appreciated the forcible manner in which Mr. Horace Avory, on behalf of the Assessment Committee, submitted the ground on which the Committee (failing arbitration) supported the assessment of the Gas Company's works, &c., made by the Overseers. The decision of the Recorder appears to leave the point raised in an unsatisfactory and unsettled state, which, in our opinion, must eventually be carried to a higher Court. Our Association are of opinion that, if an appeal should be lodged in this matter, and the same should result in a reversal or modification of the Recorder's decision, the Gas Company would (either on their own account only, or perhaps more likely on a joint account with other gas companies) take the case to the Court of Appeal, and possibly to the House of Lords. We, therefore, on behalf of a large and influential number of the ratepayers of the borough, trust that your Board will, on full consideration of the matter, decide that this point of law could, with advantage to the borough, be better fought out by some Union of larger rateable property, to which the result would be of more moment, and on which the legal cost would not bear so heavily as on your Union.

It is not with any lack of appreciation of the point, or rateable income involved, that we desire to address your Board; but rather

that, owing to the very serious state of trade and of finances in the borough, we feel that your Board will be consulting the best interest of the borough by allowing the matter to be fought out by some other and more wealthy Union, and that after a final decision on the point has been pronounced, your Assessment Committee can take such steps to avail themselves of the benefit thereof as they may then decide to be best.

In writing you, we do so not only on behalf of members of our Association, but also on behalf of several other ratepayers in the borough, who have expressed themselves as of the above opinion. We may add that the Gas Company are not members of the Association.

Continuing, the Chairman remarked that he had also, on the other hand, met several large ratepayers who were in favour of their going to the Divisional Court. If they did not, the case might not arise again for twenty years. The Association appeared to overlook that if the Committee decided to abandon the appeal to the Divisional Court, they would sink £1000 costs, and lose £800 rateable value, which a decision by the Divisional Court in their favour would give. Now, £800 rateable value meant a yearly income to the town of £300 in rates. If the case had to go beyond the Divisional Court, it was most probable that other Unions would join the Ipswich Board, and undertake to bear a share of the costs.

On being put to the vote, the proposal to appeal was carried with one dissentient—Mr. W. Reeve, who said he did not consider Ipswich should fight alone, though he would have no objection to the appeal if other Unions joined.

DANISH GAS COMPANY.

Contracts and Works Extensions—Employing the Reserve Fund.

The Annual General Meeting of this Company was held last Tuesday, at the London Offices, No. 13, Victoria Street, S.W.—Mr. CORBET WOODALL in the chair.

The SECRETARY (Mr. H. G. Warren) having read the notice calling the meeting, and other formal business having been transacted, the Directors' report and the accounts were taken as read (*ante*, p. 258.)

The CHAIRMAN said it was again his pleasant duty to propose the adoption of the report and accounts. The first paragraph in the report stated that the balance of profit of net revenue for the year was £11,261 greater than it was for 1905. This in itself was a very satisfactory statement; and he had no disposition to belittle it in any way. But it required a word or two of explanation. The preceding financial year was one of very heavy expense to the Company. They made a large contribution to the officers' pension fund in Denmark; contributed also a considerable sum in the shape of a donation to the officers and workmen, in honour of the Company reaching its jubilee; and there were special expenses, heavier than customary, with regard to maintenance and wear and tear. The result was they did not that year earn their dividend by some £5000 or £6000. This year, while they had incurred a normal amount of expenditure for maintenance, repairs and renewals, and all ordinary charges, they had not only earned the dividend, but were able to carry over a sum of £6000 to the undivided balance. Out of the year's earnings some £12,000 odd had been added to the depreciation account and over £7000 to the reserve fund, which now stood at £73,330, out of which there had been invested some £10,200. The remainder was used as working capital in the undertaking. Of the depreciation fund, which stood in the books at £75,756, there had been invested £74,826, or a little over the nominal amount. No more profitable investment could be found for the surplus moneys than in their own undertaking. If they did not use their own surplus for this purpose, they would have to call up capital to provide for their needs; and the income from the outside investment would not equal the charge on the extra capital. Where, however, as in an undertaking like their own, the profits made were dependent upon contracts which had a period, and not a long one, to run, and where, further, a loss—certain, though not capable of exact estimation—would accrue when the contracts matured, it seemed to the Board to be absolutely essential that they should have a considerable sum of money available out of which to deal with such loss upon the maturity of the contracts. During the year, extensions of works and plant had been made to the value of £17,000; and they had written against this the sum of £1610, which had been taken from the reserve fund to allow for depreciation in the value of meters, arising from the fact that they were now purchasable at lower prices than they were a few years ago. Some £6600 had been spent at Frederiksberg on new works, upon which there remained about £28,000 still to be paid. They had had considerable expenditure on mains, also upon additional service-pipes and meters. In both of these cases, only a certain proportion of the cost was charged to capital; a moiety was carried, in the case of services, to revenue. These were the main items of the expenditure; but he was glad to say the capital expenditure in relation to business was a reducing quantity. Although large sums were being spent, yet year by year they were able to show that the cost of dividend was less per 1000 cubic feet; and the amount of capital was also less per million cubic feet of gas sold. He ought also to mention that they were at present largely extending the works at Odense, as well as those at Frederiksberg. They had also before them the possibility of having to build large new works at Flensburg, or make a considerable extension of the old ones there. He had already referred to the terminable nature of the contracts under which the Company were working; and Flensburg was a case in point. The contract there came to an end in 1914. But they now found themselves with their works practically full; and the necessity had arisen for the erection of new ones. It was some five years since a scheme was submitted to the Municipality of Flensburg under which new works were to be built. This had the approval of the Municipality; but a number of matters arose, chiefly because of the large number of authorities in Germany who had to deal with the question of plans for new works, and also because of the opposition of some neighbours respecting the possibility of the Company causing a nuisance. Then subsequently, and comparatively recently, the Municipality had called in an Engineer acquainted with gas matters to advise them with regard to the plans that had been submitted. The Engineer suggested extensions of the scheme; and it had now become a matter of spending £100,000, where the Board originally contemplated laying out about £55,000. In the meantime, five years had gone by; and there remained only eight before the end of the contract. The Board felt the burden was too great for them to take up to expend such a large sum of money with so small a period left wherein to profit by the more economical new works. A few days ago, a deputation of the Directors had met the Municipality, and discussed the matter with them. They then assured the Board that they were in earnest, and desired to push the matter forward, but they had not yet come to a conclusion. The Directors would probably send to the Municipality, in the course of a few days, certain suggestions, tending to relieve the Company from this burdensome obligation. The Company had also been asked to supply gas and water to certain districts in the neighbourhood of Elsinore and the Strandvei. The Directors visited these districts, and were quite satisfied that—if proper conditions could be arranged as to the tenure of their position in the place, the length of the concession, the rights as to the laying of mains, and so forth—the Company should undertake these contracts; and a resolution would be proposed later on authorizing the Company to undertake the supply of water. He was glad to say, with regard to the stations visited, that the Directors found them in excellent condition, and generally prosperous. The rate of increase of the Company was satisfactory at all the stations. In every case—there was not a single exception—the capital account was a diminishing quantity. He thought he could congratulate the shareholders upon a position of prosperity equal, if not superior, to anything he had had to refer to in the past.

Lieut.-Col. T. H. LEWIN seconded the motion.

A few questions having been put,

Mr. A. BAIRD expressed the gratification of the shareholders at the satisfactory nature of the report and balance-sheet; but he demurred to the greater part of the reserve fund being invested in the Company. He quite understood, to a certain extent, the Directors' reasons for preferring to get a larger return on the money than the smaller one that would be obtained if the investment was outside the business. But this, he was of opinion, was not altogether sound finance. In his own profession—that of a banker—they always considered that a reserve fund, to be properly so constituted, ought not to be invested in the business of the Company itself. If the money was invested in the Company, it was no longer available.

The CHAIRMAN, in reply, said he ventured to suggest that the financial position of the Company would not be so good as it was to-day if the Board had not followed the principle of using some at least of their reserves in carrying on the business. They had altogether, in the depreciation fund, the reserve fund, and shares which were the property of the Company, more than £200,000 of reserves; and remembering the total capital was only £700,000, or a little over, he thought the proprietors would consider this a very fair provision.

Mr. BAIRD said his point was the availability of the fund.

The CHAIRMAN replied that they had a depreciation fund, which was the only one they were likely to have any calls upon—the only one they could see the probability of having any special calls upon—invested outside the undertaking, to an extent slightly over the nominal amount. They had more than £10,000 of the reserve fund invested outside; and they had £70,000 of shares in the Company, which the Directors were at liberty to sell any time they chose. He thought, on the whole, it was not much out of so large a sum to have £60,000 employed as working capital, and earning a very good return.

The motion was unanimously carried.

A final dividend for the year ended June 30 last of 2½ per cent. on the preference shares and 5 per cent. on the ordinary shares was declared.

Proposed by the CHAIRMAN, and seconded by Mr. J. H. BIRCHENOUGH, Lieut.-Col. T. H. Lewin was re-elected a Director, as was also Mr. R. S. Gardiner, on the proposition of Lieut.-Col. LEWIN, seconded by Mr. F. W. CHURCH.

Mr. Edwin Waterhouse and Major Critchley were re-appointed Auditors, on the motion of Mr. SIDNEY GEDGE, seconded by Mr. T. WILKINS.

Proposed by Mr. BAIRD, and seconded by Mr. BERNARD WILKINSON, a hearty vote of thanks was passed to the Chairman and Directors and to the Secretary, the officers abroad, and their staffs.

The CHAIRMAN, in replying on behalf of himself and his colleagues, said he should like to add a few words with regard to the staff. Having just returned from Denmark, the Directors had very vividly in their minds the men they had met while abroad. Not only with Mr. Warren, the Company's Agent here, but with Mr. Cridland (whom the Board regarded as the very centre of their undertaking in Denmark), with Mr. Edwards, their Engineer, and with all the officers at the stations, they had every reason to be satisfied. The Board thought the mantle of Mr. Marshall had fallen upon worthy shoulders; and the work was going on very well.

Extraordinary Meeting.

An Extraordinary Meeting was then held at which certain alterations (to enable the supply of water in a new district) were, by resolution, made in the Company's statutes. The reason for the alterations had been explained in the Chairman's opening speech; but he added, in moving the adoption of the resolution, that if the Company were to have the contract for the lighting of the districts near Elsinore, they must also undertake to provide water. The Board saw no reason why the water should not be as profitable as the supply of gas. The proposition was seconded by Mr. R. S. Gardiner; and, as indicated above, was unanimously agreed to.

This concluded the proceedings.

Gas-Works Improvements at Mansfield.—An inquiry has just been held by Mr. H. R. Hooper, on behalf of the Local Government Board, into an application by the Mansfield Town Council for sanction to borrow £15,000 for the purposes of the gas undertaking, £8000 for the electricity works, and a further sum of £2870 for public baths.

COLONIAL GAS ASSOCIATION, LIMITED.

The Annual General Meeting of the Association was held last Tuesday, at the London Offices, Suffolk House, Laurence Pountney Hill, E.C.—Mr. SAMUEL SPENCER in the chair.

The SECRETARY (Mr. Alfred J. Kingdon) having read the notice convening the meeting, and the Auditors' certificate, the report and accounts were taken as read.

The former stated that, after writing off £1028 for depreciation on works, there was a profit of £5949, from which £1695 was paid in April last, as an interim dividend at the rate of 4 per cent. per annum. After providing for interest on debentures, &c., to June 30, there remained a balance, including the £845 brought forward, of £3561 9s. The Directors recommended a dividend, for the second half of the year, at the rate of 6 per cent. per annum, free of income-tax, making 5 per cent. for the year. This will absorb £2543. It was also recommended that £250 be added to the reserve fund, increasing it to £3500, and leaving £768 to be carried forward.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, at the meeting of the shareholders last year, it was stated that there was every prospect of better results for the then ensuing year. Although this had proved to be the case, the improvement was not so much as was hoped for. However, the prosperity of the Colony in every direction was so satisfactory, and well spoken of by all the prominent men in Australia, that one could not help thinking the better results would be felt much more in the current year's trading than in the past year's. And perhaps this was only natural, as last year things were only just turning for an improvement, while the present year seemed to be moving along considerably faster; and it was thought, and said by a great many, that there was every prospect of a continuance of good trade for some years to come. This must be felt in the various towns in which their works were situated; and without a doubt they would enjoy the benefits arising from such a state of things. They had had two half-yearly reports from their Managing Director (Mr. Swinburne); and they were open for perusal by any shareholder. Mr. Swinburne's remarks he (the Chairman) felt sure, would be considered satisfactory by every proprietor, both as to the past year's working, and his anticipations for the year to come. In addition to these reports, he had had letters from Mr. Swinburne. In February last, he wrote: "I think the business is very sound and progressive; and I do not think there is any doubt as to our continuing 5 per cent. from now." In August, he wrote: "The increased profit might have easily been made more. But fairly large debits have been put through, as you will see. Also for the past twelve months, I have been gradually increasing the wages of the men at the works, because I was not only anxious to retain them, but to bring their wages up to what I consider a higher level." He (the Chairman) was confident that every shareholder would support the action of their Managing-Director; and his treatment of the men, he was certain, would ensure their having better work and results from the policy being pursued. From these remarks, and by the balance-sheet, the shareholders would notice that the Directors could have increased the dividend. But it was thought better to pay 5 per cent. for the year—the same as last; and whatever advantage there was in the year's working, might as well run on to next year's balance-sheet, when, if an increased dividend was not paid, he for one would be much surprised, as everything pointed in that direction. He felt pretty confident that they would not be disappointed. Turning to the balance-sheet, he did not think it was necessary to say much, as, generally, the figures must be considered by the shareholders to be fairly satisfactory. The increased sale of gas amounted to 4 per cent., which, in itself, was not quite so good as last year. This was to some extent explained by the increasing use of incandescent gas mantles; as in Australia, as well as in this country, it made some 2 or 3 per cent. difference in the rate of increase of consumption. The sales of residuals had not been quite so good as expected. At four of the works, the market was very poor; and at one works, through the railway removing their workshops, they had to find a buyer a long way off, and consequently had had to sell at a very much reduced price. However, altogether their revenue as regarded gas, residuals, and fittings profits, was better than for the previous year. The number of consumers had increased by 138. The Directors recommended that £250 be added to the reserve fund, making it £3500. Since the date of the balance-sheet, another £1000 of this had been invested outside the Company; and £1028 more had been written off for depreciation. The present year was opening well; and excellent increases were being reported. Just now there was some likelihood of a strike at the collieries; and it might result in an increased price for coal. Mr. Swinburne had, however, succeeded in obtaining a supply sufficient for three months, and that, of course, at the old figure. The Directors had to announce with regret the death of their late colleague, Mr. G. H. Haywood. To fill the vacancy, Mr. F. R. Smith was asked to take a seat on the Board. Mr. Smith was a gentleman known to three of the Directors for many years; and he was well up at all points concerning gas matters. The Directors asked with confidence the confirmation of his appointment by the shareholders.

Mr. CHARLES HUNT seconded the motion, remarking that, after the lucid statement of the Chairman, it was not necessary for him to say anything beyond expressing the hope that the improved position of the Association would be regarded as satisfactory by the shareholders as it was by the Directors.

The motion was unanimously carried.

On the motion of the CHAIRMAN, seconded by Mr. F. R. SMITH, it was agreed that a dividend, free of income-tax, for the second half of the year, should be paid at the rate of 6 per cent., making 5 per cent. for the year, and that £250 be added to the reserve fund.

The CHAIRMAN, in moving the confirmation of the appointment of Mr. Smith for the remainder of the term for which Mr. Haywood was elected a Director, said the Directors were very sorry indeed to hear of Mr. Haywood's death, which took place somewhat suddenly. He was with them from the inception of the Association; and he used to attend the Board meetings pretty regularly until ill-health, at the latter part of his life, prevented him doing so. As to Mr. Smith three of the members of the Board had known him many years—he thought he (the Chairman) might say twenty or more; and he was sure they could not have a better man to fill the place vacant by Mr. Haywood's death.

Mr. A. GODWIN-HAMMACK seconded the motion, which was unanimously carried.

Mr. SMITH thanked the members for this mark of their confidence. He said he should do his best in the interests of the Association.

Mr. W. C. PARKINSON moved that the Hon. Thomas Bent be re-elected a member of the Board. He observed that the Association had always been well served by those who had held office for them out in the Colony; and it was well to have men in influential positions to fill such offices.

Mr. CHARLES HUNT seconded the proposition, which was unanimously agreed to.

On the motion of Mr. R. H. DYER, seconded by Mr. G. GREGORY FISHER, the Auditors, Messrs. Wood, Drew, and Co., were re-appointed.

Mr. DYER moved a vote of thanks to the Chairman and Directors at home and abroad. He remarked upon the very satisfactory balance-sheet, and expressed his pleasure that the Directors were writing-down both the stock and the capital.

Mr. F. G. PAINTER seconded the motion, which was unanimously carried.

The CHAIRMAN'S acknowledgment concluded the proceedings.

NOTTINGHAM GAS CONTROVERSY.

Municipally the history of Nottingham presents no parallel to the conditions which were associated with the contests decided on Thursday last. Ordinarily at election times there are not wanting topics which are likely to give rise to a certain degree of animation; but there was an amount of bitterness imparted into the recent struggle which went perilously near to the brink of dangerous personal recrimination. The heat may be said to have been entirely engendered by the now somewhat long-drawn out controversy in relation to the management of the gas undertaking.

Those who argued in favour of the publication of the evidence adduced before the Special Committee of Investigation, were singled out for special criticism by many of the speakers who are associated with the Liberal majority in the Council. The point was harped upon, almost to the length of wearisomeness, that the testimony having been given under the pledge of secrecy it could not in fairness to those involved be now brought into the light of day. But none the less the public feeling has been thoroughly aroused; and the result of the elections shows pretty conclusively that those who desire that all further discussion should be stifled, do not form a majority of the burgesses. The net result of the contests was a gain of two seats to the Conservative party—one being in the Trent Ward, where the Secretary of the Amalgamated Society of Operative Lacemakers, who sought re-election in the Labour and Liberal interest, was ousted by a gentleman who has been responsible for much good work in the town. Bearing in mind the extent of the influence brought to bear from Trades Union quarters upon the control of the gas undertaking, the defeat of so prominent a representative of Labour interests was here not without its significance. But more important still was the victory in another densely populated ward of Dr. Milner, a Conservative and member of the Gas Committee, who had been singled out for special abuse by reason of his outspoken utterances in relation to the gas question. Figuratively speaking, the big guns of the Liberal party were trained on Dr. Milner, whose offence was heightened in the eyes of his opponents by reason of the fact that he had had the temerity to openly commend in the Council the Gas Engineer (Mr. J. H. Brown) as one who had attained to the highest honours in his profession. Dr. Milner had threatened during the contest to "speak out;" and the prospect did not seem to be altogether felicitous to some who had been concerned in the control of the undertaking. The answer to a particularly bitter attack was that he was re-elected by a record majority; and he has interpreted it as indicating that the electors are in no humour to allow any scandal under the Corporation to be hushed up. Mr. Harlow, the late Chairman of the Gas Committee, found in Dr. Milner his particular *bête noir*—charging him in a speech which was made at the Liberal Club, after the declaration of the polls, with making statements which were "maliciously untrue."

With a strengthening in the Council of the hands of those who have from the first advocated the fullest and most open inquiry into matters connected with the gas undertaking, the demand for a Government investigation appears likely to grow in volume. The elections render some such process almost inevitable. The only point as to which doubt seems to exist is whether there is any authority whose official intervention, under statutory or other power, can be invoked. Meanwhile, the proposals of the Special Committee as to suggested re-arrangement of offices by a division of responsibility between the Engineer and another person to be chosen, have come in for a good deal of not altogether friendly criticism. It hardly requires any special training in matters pertaining to the making and distribution of gas to see that such an alteration is scarely likely to prove either economical or effective. But the matter, as far as it has gone, is purely in the nature of a recommendation by the Special Committee to the new Gas Committee, to be chosen at the annual meeting of the Council on Friday next. There has been such an amount of hostility already evinced in regard to the proposals, by reason of their unbusinesslike character, that they seem almost to stand condemned in advance. The composition of the new Committee, and particularly its chairmanship, will be watched with keen interest, not only in Nottingham, but in gas circles generally.

Mr. Harlow's Reply to Dr. Milner.

Speaking at a meeting last Tuesday in support of a retiring Liberal representative for the Bridge Ward at Nottingham, Mr. E. Harlow, the late Chairman of the Gas Committee, made a long reply to the

remarks of Dr. Milner reported in last week's "JOURNAL." The following extracts are taken from the report of the speech which appeared in the "Nottingham Express."

He said Dr. Milner had stated that there was no Engineer for nine months. That reference was most misleading. The gas undertaking, though it had no Engineer, had a Chairman (he was not occupying that position, and therefore took no credit himself), and there were three superintendents of the three different works—men who were paid salaries of £300 and £400 per annum, men whom they would recognize were responsible. These men were quite capable of making good gas. Dr. Milner made a great point of this. But surely three years were sufficient to put the works in order again. And when they knew exactly what was the cause of the complaints, as all knew of the bad gas, they could not at that late hour talk of the state of the works. They had dealt with the facts of the case. They had had bad gas—wretchedly bad—and they thought the fittings were responsible; but when they recognized the real cause, he at once took up a different stand altogether. Many sarcastic remarks had also been made about two gentlemen on the Committee. Dr. Milner had said that before they had been on the Committee two years, one was made Chairman and the other not made Vice-Chairman, "by a fluke." He would remind Dr. Milner it was not always the man who sat on a Committee forty or fifty years who was the best man. He did not say that because he was elected Chairman, but because the remark was most ridiculous. He gave the utmost attention to the business in hand, and did his level-best to bring the concern into proper order. He was asked to take the chair by responsible persons, and to find out what was the matter, and try to remedy it; and he did so.

Mr. Harlow next replied to Dr. Milner's allegations against the Liberals—that after the Conservatives had left they appointed a Sub-Committee of four Liberals to investigate. This statement was not true. It was correct to say that the business on the *agenda* supplied to the members had been finished; but there were always general items left over which the Chairman introduced at the finish. This was one of the items discussed before the meeting, and after the *agenda* had been prepared; and when several were leaving the room they were informed there was other business to be done. Dr. Milner undoubtedly left the room, but that was nothing unusual; and if the Conservatives left a meeting, it was their look out, and not the business of the remainder of the Committee. Dr. Milner had also urged that Alderman Ford declined to have anything to do with the Committee; but he sat on the Special Committee, attended regularly, agreed to the course adopted, and then at last ran away.

"But," went on Mr. Harlow, "the most serious part of the speech is the innuendo thrown out by Dr. Milner with reference to my conduct. 'Was it advisable that members of a Committee should belong to any Company which traded with the Corporation?' asked Dr. Milner. That is an insinuation, not a statement. He never mentioned the Company by name; and that is rather un-English. Dr. Milner continued: 'It was an extraordinary thing that this Company, which years ago did a large amount of trade with the Corporation, could not, after the advent of Mr. J. H. Brown, for good reasons which I suppose he had, have done so much trade with the Gas Committee.' Why, I ask, is it extraordinary? All this business is contract work; we do not send out an order and say do that and charge what you like. The prices are scheduled and fixed once a year; and, of course, firms lose orders from time to time, and other firms get them. But what does Dr. Milner mean by this, and what information had he on it, and where did he get it from? It was never discussed in Committee. Who gave him the information? If he knows anything, why does he not speak out? What is the mystery, and who is it that is doing wrong? What Company is it that is being favoured? Dr. Milner says he has been attacked in a most unwarrantable manner; he has been hit below the belt, he says. But I ask you this: You have heard these statements; and what are these statements, these innuendoes, but hitting below the belt? What more is it? I will go further, and say it is not only hitting below the belt, but it is a distinct stab in the back. If Dr. Milner means to insinuate that I, in my capacity of Chairman of the Gas Committee, used my position to influence the placing of orders with companies with which I had business relations, my reply is he is speaking either with wilful disregard to facts, or on insufficient information, or with utter recklessness. I say deliberately and indignantly that the insinuation is absolutely false and groundless. After a business career of nearly a quarter-of-a-century, it is painful to have to stoop to deny such an insinuation.

Mr. Harlow (continuing) alluded to the allowance of £35 that had been made by the Gas Committee to a consumer. He said a question was raised at the last Council meeting as to a remark made by one of the Elective Auditors in his last report to the Council on the gas accounts. An allowance of £35 had been made to a consumer in settlement of a claim for the incorrect registration by meters. The Auditor in question stated in his report: "In the case under notice, the testing process was applied, resulting in a possible excess registration which would not amount to the value of more than £3, though an allowance of £35 was made, for which he could obtain no adequate information." Well, a manufacturing firm using a large quantity of gas complained that their meters were not registering satisfactorily; and it was arranged that they should be tested. On this being done, the meters—one a 1000-light meter—were found to be registering against the consumer. In one case the discrepancy was as much as 8 per cent. On this being ascertained, the Company demanded repayment of about £70 on the ground of their having paid for gas which had not been supplied, not for one quarter only, but a short term of years during which the meters had been registering inaccurately. After some negotiation, an agreement was arrived at between the Managing-Director of the Company and the Gas Engineer, to compromise the dispute by the Gas Committee making an allowance to the Company of the sum of £48 odd—the agreement to be subject to the approval of the Chairman of the Gas Committee. Mr. Harlow continued: "The matter was then referred to me as Chairman to arbitrate upon. The events I have described took place some time near the end of December, 1905; and the matter was not brought to my notice until after the arrangements between the Managing-Director and the Gas Engineer. I most carefully went into the whole question; and so far as I can remember I gave my decision at the end of January, or the beginning of February, 1906. I decided to agree to a settlement of the claim for £35, instead of £48 odd as had been previously arranged between the Engineer and the Managing-Director of the Company. That is the whole history of the case, so far as it was brought to my notice. It was an ordinary business transaction; and if I had to decide on it again, with the same evidence at my disposal, I should not make the slightest difference in my award. Now, as I have explained the matter of the allowance, I think it due to myself and to you that I should explain how the business was raked into the Auditor's report. A certain Councillor (Dr. Milner) wrote the Auditor in question asking him to give him a call. The Auditor saw the Councillor; and it appears that, as the result of the interview, he (the Auditor) repaired to the gas offices and turned up the ledger account of the Company I have just been talking about, to discover the transaction. What inquiries he had made about the allowance, I am not in a position to say; but I do know that no inquiry was addressed to me, though the Auditor's remarks are undoubtedly intended to convey an unfavourable impression as to my *bona-fides* in the matter. I also know, in the light of subsequent events, that there is only one official in the Gas Department who would be likely to make the statement to either the Councillor or the Auditor that the allowance was excessive, and, strange to say, that official is not employed in the Accountant's Department. I was not made aware until many months afterwards that this official stated that £3 was about the amount that should have been allowed. At all events, there is nothing in the ledgers from which an Auditor could ascertain what the loss on any incorrect registration would amount to. Another remarkable thing is that the Auditor had, I have reason to believe, previous to this visit, passed this particular ledger in his audit; and it appeared that it was only when his attention was called to the matter—presumably by persons whose only object could be to make mischief—that he (the Auditor) thought it necessary to make any comment on the matter. I think I have said sufficient to show you that the whole thing is a mare's nest, and that the sole reason for its being brought up is to endeavour to make unclean political capital out of a perfectly straightforward and ordinary business transaction. I will only add that such actions inevitably recoil on the heads of persons who lower their dignity by resorting to them, be they Auditors or Councillors or both."

PUBLIC LIGHTING OF ST. AUSTELL.

Electricity Adopted.

The St. Austell District Council, at their last Monthly Meeting, decided, on the recommendation of the Lighting Committee, to accept the Electric Lighting Company's tender for the street lighting. The matter has already been referred to in the "JOURNAL;" the facts of the case having been clearly set forth in a letter from Mr. Harold E. Riley, the Engineer of the Gas Company (see p. 114). The Gas Company tendered at 35s. per lamp, and £1 per lamp extra for three double burners. The Electric Light Company tendered at £1 5s. per lamp, with an additional charge of £14 a year for switching on and off—making 27s. 6d. a lamp, or 7s. 6d. below the Gas Company's tender. Readers will be able to some extent to judge of the benefit the electric lighting people are likely to secure from their contract, from the contents of circulars which were issued to the ratepayers during the consideration of the subject, and which explain the position from the respective points of view of the Gas Company and the Electric Light Company.

In the statement prepared by Mr. Riley on behalf of the Gas Company, attention was drawn to the fact that the Electric Lighting Company were offering to light the public lamps at about one-fourth the price charged to ordinary consumers; while the Gas Company proposed to charge a rate which was practically the same as that charged for gas supplied for cooking purposes. To this Mr. J. W. Cranfield, the Secretary of the Electric Lighting Company, replied that their charge for public lighting was also based on the price his Company charged for electric heating and cooking. How much demand there is in St. Austell for electricity for heating and cooking we do not know; but it is certainly not a large factor in the load of the majority of electricity stations, and it is not likely to be a very profitable business at St. Austell if it is taken at the price which was tendered for the public lighting. The Gas Company's circular to the ratepayers was in the following terms: "We have had a large number of inquiries from consumers as to the reason why the Gas Company's tenders for the public lighting of the town is 7s. 6d. per lamp higher than that of their competitors; and as some are likely to be misled by the figures, it is only fair to explain that the Electric Light Company's tenders of £1 7s. 6d. per lamp is based on a price of 1½d. per unit, or less than one-fourth of the price charged to the ordinary consumer, who has to pay 5d. per unit. The Gas Company's tender of £1 15s. per lamp is based on a price of 3s. 5d. per 1000 cubic feet—the rate for gas for cooking purposes. The Gas Company, under the terms of their Provisional Order, would not be allowed to quote at one-fourth the price charged to the ordinary consumer even if they wished to do so, which they do not." In the Electric Lighting Company's reply, it was suggested that the Gas Company were seeking to confuse the issue by "dragging in irrelevant figures," and were desirous of obscuring the fact that the Electric Lighting Company were prepared to undertake the public lighting for £155, as against a sum of over £275 which gas lighting cost the ratepayers last year. "Public lighting," said Mr. Cranfield, "can always be done at a much lower figure than ordinary lighting, owing to the longer hours of use."

In the past two years the Gas Company's charges for gas have been £224 and £223; while there was an extra cost in the first year of £50 and in the second of £60 for lighting and extinguishing. In their new tender, with the economies explained by Mr. Riley in his letter in the "JOURNAL," the Gas Company's inclusive charge (according to Mr. Cranfield) would have been £200, as against the Electric Lighting Company's offer to undertake the lighting for an inclusive sum of £155.

PUBLIC LIGHTING OF BRISTOL.

Costliness of Electricity.

The following letter has been addressed to the Editor of the "Bristol Times and Mirror" by Mr. John Phillips, the Secretary of the Gas Company.

I have been asked many times, during and since the late Local Government Board inquiry, as to the cost to the city of public electric lighting as compared with gas. With your permission, I will, as briefly as possible, answer through your columns.

At the inquiry, the following statement was made on behalf of the Electrical Committee: "With gas at 1s. 9d. per 1000 cubic feet, the cost of a lamp would be £1 7s. 10d., and the other cost in connection with a gas-lamp not paid by the Gas Company would be £1 7s. 4d., or £2 15s. 2d. as the cost of a gas-lamp purporting to give 75-candle power per lamp." The latter item (£1 7s. 4d.) includes, I presume, the cost of lighting, extinguishing, repairing, cleaning, maintenance of mantles, &c. This work was formerly done by the Gas Company, but has been taken over by the Corporation, with, doubtless, a view to economy. Let us see how it works.

In 1902, we made an offer to the city to supply new lanterns (at a large outlay to the Company), fix burners giving 100-candle power, and do all the work mentioned above, at a reduction of 6s. per lamp per annum as compared with the charge for lamps with flat-flame burners. With gas at 1s. 9d. per 1000 cubic feet, the cost per lamp would be £2 7s. 2d. per annum. Our offer was rejected. As a consequence, the city has to provide any new lanterns required in the old line of streets, and, in addition, pay 8s. per lamp per annum in excess of what the Gas Company would have charged (with gas at 1s. 9d.). As there are 3200 incandescent lamps in Bristol, the ratepayers are paying £1280 per annum for the mistake made in 1902, and for the pleasure afforded the city authorities of doing the work of lighting, &c., themselves.

There are still about 5800 lamps with flat-flame burners. If these are converted to incandescent lighting, a further sum of £2320 per annum must be added to the above. Here we have one example of municipal management and economy—less light; increased cost.

Now, as to the total extra cost of electric lighting over gas. The electrical account for 1905 shows a payment by the city as follows:—

Electricity.	£9,976
Attendance, &c.	1,915
	£11,891

The lamps thus lighted displaced 1200 gas-lamps. The cost of gas, at the present price, together with the cost of lighting, repairing, &c., these lamps, based upon the lines of our rejected offer

Would be	£2830 per annum,
Or a difference of upwards of . . .	9000 ,,

The Town Clerk was requested to report upon the statements contained in this letter; and at the meeting of the Sanitary Committee on Thursday the following remarks from him were read.

The figures given at the local inquiry were taken from a report of the City Engineer dated June 21, 1905, and the details, as set forth in the report, are: Annual cost of one pillar with lantern and fittings—Repayment of capital charge for pillar, lantern, and fittings, and interest at 3½ per cent., 6s. 4d.; lighting, extinguishing, painting, &c., 16s. 6d.; repairs, 9d.; mantles, glass, and rods, 3s. 9d.; total cost without gas, £1 7s. 4d. If the lamp is fitted with a 3-feet incandescent burner and a bye-pass consuming altogether 4 feet per hour, the cost of the gas, at 1s. 9d. per 1000 cubic feet, is £1 7s. 10d.; total cost with gas, £2 15s. 2d.

It will be seen, therefore, that this statement of cost included the capital charge for providing the pillar and lantern. The Secretary compares this with a quotation given by the Gas Company, which only included the provision of a lantern, and did not include a pillar. The City Engineer's statement was correctly made use of at the inquiry, as it was being compared with another figure which included the capital charge for a lamp-pillar. But the Secretary has inadvertently misused it, by comparing it with a figure which does not cover identical items. The Secretary has also omitted to mention that the offer of the Gas Company, which included the fitting of new lanterns, was encumbered by a condition that if at any time the Corporation discontinued a lamp so fitted, they were to pay to the Gas Company the sum of £1 1s.; and if, therefore, the Corporation desired at any period of time, however distant, to carry out an extension of public electric lighting, involving a discontinuance of (say) 500 gas-lamps, they would have been obliged to pay the Gas Company £525. The Sanitary and Improvement Committee, of course, rejected this offer; and they obtained from the Gas Company a second offer, to perform the same services as were comprised in the first offer, with the exception of the provision of a lantern, but without any reduction in the price. This offer was accepted; but when the Gas Company found that a scheme had been prepared for an extension of public electric lighting, involving the discontinuance of 527 gas-lamps, the Company, by letter of April 5, 1902, stated that they were not prepared to carry out their second offer, and they subsequently refused to make any fresh offer.

It will be seen, therefore, first, that the Secretary is incorrect in stating that the price paid by the Corporation for the services in respect of the public gas-lamps exceeds by 8s. per lamp per annum the price for which the Gas Company were prepared to perform the same services; secondly, that the first offer of the Gas Company was rejected by the Corporation for a reason which made it impossible for them to accept it, and which the Secretary has omitted to refer to; and, thirdly, that the Gas Company's second offer was withdrawn by the Company.

Further information on the matter is being collected, and will be submitted at a subsequent meeting.

GAS PROFITS AT HINCKLEY.

Rates Relieved—Manager's Salary Increased.

At the Meeting of the Hinckley Urban District Council last Tuesday, Mr. G. Kinton presented the report of the Gas Committee, who recommended that the sum of £260 (equal to a rate of 2d. in the pound) should be transferred from the gas profits to the relief of the rates. He said the gas business was in a better position now than it had ever been before, and the prices charged would compare favourably with those in any town of the size of Hinckley or even larger. He moved the adoption of the recommendation; and the motion was carried.

The Finance Committee reported that an application had been received from the Manager (Mr. F. Lee) for an increase of salary; and they recommended that it be raised by £20 per annum until Jan. 1-1908, when it was suggested that he should be given annual increments of £16 13s. 4d. until £350 per annum was reached—the recommendation to be conditional upon him giving an undertaking to remain in the service of the Council for at least four years from Jan. 1 next. Mr. Kinton, in moving that the application be granted, said Mr. Lee had been with them 8½ years, and during this time the number of meters had nearly doubled, the increase in the number of stoves was 702, and in the gas consumption 46 per cent.; while the leakage had been reduced from 14 to 1·56 per cent., which meant a saving of £800. During his tenure of office, the profits had amounted to £14,836, compared with £1138 in the previous 8½ years. The price of gas had been reduced 6d. per 1000 cubic feet, and there had been a saving of nearly £2000 to the consumers. The amount of capital paid off had been £17,293, as against £3987 during the previous 8½ years. In conclusion, he mentioned that the Manager got on well with the Committee, and had the interests of the town at heart. The recommendation was carried unanimously.

IRONMONGERS AND THE SALE AND HIRE OF STOVES.

Our readers may remember that, as the result of a conference held in the spring of last year between the representatives of the ironmongery trade in Croydon and the Directors of the Gas Company, an agreement was come to under which gas stoves, fittings, &c., were sold and let on hire on what at the time appeared to be advantageous terms. With the view of finding out how the agreement had worked, so that ironmongers in other parts of the country might be guided in the matter, a member of the staff of the "Ironmongers' Chronicle" was deputed to visit Croydon, and obtain the views of the parties concerned upon the subject; and the results are published in the current number.

The first person called upon was Mr. Charles Hussey, of the firm of Messrs. Hammond and Hussey, Limited, who is not only an ironmonger, but the Chairman of the Gas Company, and the question put to him was: "Does the agreement with the Gas Company benefit ironmongers?" The answer was: "Most certainly it benefits them—or at least those who interest themselves in the matter, and do what they can to push the sale of the gas cookers, fires, and fittings generally. . . . The Company lend to the ironmonger without any payment, and subject only to the condition that he should display them to advantage, a number of cookers, fires, and other fitments. These he can either sell outright or let out on hire. If he sells the fitment, he makes a profit at 15 per cent.; if he lets it, the Company allow him the first quarter's rent as remuneration for his efforts on their behalf. As regards gas-fittings, I know that a good deal of talk is going on with reference to the show-room which the Company are going to open when the new buildings are completed. But the fact is, as a Company, we are compelled to do something to meet the keen competition which exists. At Caterham, the Electric Light Company are supplying cottagers with electric light on the penny-in-the-slot system. I am happy to say the scheme has not proved too successful, and that we have taken a good many of these fittings out and reintroduced gas. But you will see how necessary it is for the Company to do everything possible to hold and increase their business, and so we must meet the consumers by assisting them to obtain the very latest, best, and most artistic fittings in the way of pendants, brackets, &c. The ordinary ironmonger cannot be expected to carry a large stock of these things; but the ironmonger who finds himself in the position of being unable to satisfy the requirements of his customer from stock will, when our new premises are open, be able to invite the customer to our show-room, and sell from there anything we have, in exactly the same manner as if the goods were upon his own premises. If he effects a sale, he can take the fitting away at once, or it can be sent on in the ordinary course of trade; and all the Company charge him is 2½ per cent. upon the price they had to pay the manufacturers."

The representative acknowledged that the arrangement seemed fair enough; and, armed with Mr. Hussey's statement, he proceeded to call upon another ironmonger. In response to his inquiry as to whether the agreement had proved satisfactory, the answer was: "Certainly it has. The ironmonger has undoubtedly benefited, and will continue to do so as long as the agreement remains in force." Another, who had not taken up the sale of stoves and fittings, said: "The terms offered seem to be most equitable; and to men in a position to push the sale of cookers and stoves, the business should prove of a most profitable nature." The last firm called upon was Messrs. G. Goldsmith and Son, a member of which (Mr. G. Goldsmith) entered fully into the nature of the agreement, which he said had "proved an advantage to all ironmongers who entered into it." He added: "It has now been in existence more than a year, and, so far as we can judge of it on the first year's working, I should say that it has proved satisfactory. Of course, everything has not happened just as we ironmongers should have wished it, neither have we got all we want; but, for a start, I

think I can say it has proved a fair arrangement. As to whether the terms will be extended and the movement spread, I think I may answer 'Yes.'"

A meeting of the Southport Ironmongers' Association was held on Monday last week, to consider the arrangements for the holding of a gas exhibition in the town. Mr. G. L. Hodge and Mr. R. M. Iddon had been deputed to meet the Gas Manager and the Gas Committee, and Mr. Hodge reported that they had had several interviews with Mr. Bond and also with Alderman Travis (the Chairman of the Committee). As the outcome of the conference, it was arranged that the ironmongers and plumbers should be allowed to sell gas-fires; the Corporation making an allowance for fixing. Mr. Hodge thought the Association were getting along very nicely, and he was hopeful that in time they would get the cooker trade in their own hands. An order for gas-fires from the Corporation would be handed over to an ironmonger or a plumber, and the Corporation would be credited with 10 per cent. upon the list price. In reference to the exhibition arrangements, the Gas Committee insisted that the plumbers should take part in it along with the ironmongers. It was stated that five firms—viz., Messrs. John Wright and Co., Messrs. Fletcher, Russell, and Co., the Richmond Gas Stove and Meter Company, Messrs. Wilsons and Mathiesons, and the Cannon Company—had all expressed their willingness to participate. The exhibition is to be held in the Temperance Institute on the 20th inst. and the three following days.

SUPPLY OF ELECTRICITY IN BULK IN LONDON.

Scheme of the County Council.

At the Meeting of the London County Council last Tuesday, the Highways Committee submitted an important report embodying a scheme for which they propose to ask the sanction of Parliament in the next session for the supply by the Council of electrical energy in bulk in London and the surrounding districts. In their introductory remarks, the Committee explain that in preparing their scheme they endeavoured to fulfil the conditions of a satisfactory and adequate solution of the question as laid down in the report of the Select Committee of the present session. The importance of electrical power as a means of developing and extending the commercial interests of London and the need of a cheap supply have, they say, long been recognized; and in previous reports they have laid stress upon the necessity of the Council being the central authority to secure such supply. In dealing with the matter they have kept before them the main object aimed at—viz., the establishment of an undertaking which will enable electricity to be supplied at cheap rates for all purposes, and which shall be adaptable to the growth of the area to be dealt with.

The scheme, as detailed in the report, proposes to provide, as far as practicable, for the eventual purchase "on certain terms" of the existing undertakings. In regard to these, Electric Lighting Orders have been granted to sixteen Local Authorities in London, which, with one exception, are now supplying electricity. Three are authorized to supply in bulk; but no such supply is being given. The Committee suggest that the Council should be empowered to acquire compulsorily, at the expiration of five years from the passing of the Bill, or at any time thereafter by giving a year's notice, the undertakings of fourteen of the Borough Councils, being those which were originally established under Provisional Orders obtained from the Board of Trade. The Borough Councils of St. Marylebone and Woolwich are not included in this list—their undertakings having been, in part, purchased from Companies. The Committee also think that the Council should be enabled to purchase at any time, by agreement, the whole or any part of the undertaking of any of the Local Authorities within the county, and to enter into agreements for the whole or any portion of the work of distribution being carried out by such authorities. The total capital expenditure incurred in connection with the undertakings up to March 31 last is about £5,450,000. It is pointed out by the Committee that the capital has, to a very large extent, been advanced by the Council on loan, and that therefore there would be no necessity to raise more money for the purposes of the acquisition. The Committee do not, however, think it will be necessary to purchase, compulsorily, the undertakings of authorities outside the County of London; but they consider that it would be useful to obtain powers to purchase the whole or part of any such undertakings by agreement. In regard to Companies' undertakings throughout the area of supply, it is recommended that the Council should be empowered to purchase them compulsorily at the times when, and on the terms on which, such undertakings would have become purchaseable by the Local Authorities, or at any time to effect purchase by agreement. The expenditure charged to capital account in the Companies books on Dec. 31, 1905, was, for Companies supplying in the county, £12,718,534. The inclusion of those supplying only outside the county would not probably increase the total to £14,000,000. The Committee are of the opinion that, "subject to the proper safeguards," the scheme should be obligatory. It is thought that the Council should have power to supply direct to large individual consumers. It is proposed that the generating station to be used for the scheme should be erected on one of two alternative sites—situated respectively at Barking and Erith; and it is suggested that compulsory powers of purchase should be sought in respect of both of these sites. The total cost of the proposed new station, including land, is estimated at £1,400,000; and the cost of the transmission and distribution system is put down at £2,650,000. It is proposed that the Bill shall provide for the maximum charges for energy being governed by the amount and regularity of the demand of the consumer—the charges to be as low as is compatible with the financial success of the undertaking. As regards the financial results, the Committee are "confident that the prospective demand for electricity is so great that the revenue derived from the undertaking will be more than sufficient to cover the expenditure, including the charges for sinking fund and interest on capital;" and they state that they are strongly supported in this view by the experts employed by the Council.

The Finance Committee, over which Lord Welby presides, also presented a report on the subject—pointing out that "most important issues of a financial nature are involved" in the scheme, especially as, under its obligatory character, the extent of the undertaking and the capital expenditure would, in a large measure, pass beyond the control of the Council. They further point out that it is proposed to acquire the powers of purchase of Companies' undertakings now possessed by the Borough Councils, which, as a rule, do not become exercisable compulsorily until 1931; while the other liability recommended—the taking over of the outstanding debts incurred in respect of electric undertakings by the Borough Councils—"is one that should be considered very carefully from the financial point of view." Then comes the suggestion that the notices preparatory to the introduction of the Bill into Parliament should be "framed in the widest possible terms, in order to leave the Council a free hand in framing the Bill." The Committee propose to present a further report at a later stage before the Council are asked to approve the Bill, when they think the Council will probably wish to further consider the financial questions involved.

Notices of opposition to the recommendations of the Committee have been given for to-day's meeting of the Council. Mr. R. A. Robinson proposes to move an amendment—"That the Council declines to embark upon so speculative an undertaking as that of compulsory supply of electrical energy to London and the surrounding districts, involving unknown capital expenditure, at the risk of the ratepayers of London, and resolves to direct every effort to ensuring that the supply which can be obtained through existing or combined undertakings is subject to such control as will provide a cheap supply, and otherwise safeguard the interests of the public." Mr. Anstruther will move—"That it is both premature and inexpedient to commit this Council to the promotion and conduct of a great speculative undertaking, wherein the cost is undefined and the liability unlimited, and of which the greater extent will be beyond the control of the ratepayers of the County of London, upon whom the risk of the enterprise will rest."

ELECTRICITY AND A SURCHARGE AT FELIXSTOWE.

Agreeing with a Company to Work an Order.

Following on the experiences of Sudbury and Bo'ness, the members of the Felixstowe and Walton Urban District Council also find themselves in a tangle with regard to an agreement made with a Company to work the Council's Electric Lighting Provisional Order.

At the adjourned audit of the Council's accounts last week, Mr. M. W. Dixon, the Local Government Board Auditor, after pointing out that he had already given notice that it was his intention to make a surcharge of £3000 included in the accounts, said it might be well to review the facts which had led up to the present position. In 1902, the Council obtained a Provisional Order for electric lighting purposes; and after considerable negotiation, in May, 1903, they entered into an agreement with the Suffolk Electricity Supply Company to work the Order. The agreement provided, *inter alia*, purchase money £8000—£5000 payable on its execution, and £3000 on compliance by the Company with certain conditions. In pursuance of section 11 of the Electric Lighting Act, 1882, the Clerk forwarded a copy of the agreement to the Board of Trade, requesting their sanction to do as appeared to be contemplated by the section. This was as follows:—

> Any local authority who have obtained a Licence, Order, or Special Act for the supply of electricity may contract with any company or person for the execution and maintenance of any works needed for the purpose of such supply, or for the supply of electricity within any area mentioned in such Licence, Order, or Special Act, or in any part of such area; but no local authority, company, or person shall by any contract or assignment transfer to any other company or person, or divest themselves of any legal powers given to them, or any legal liabilities imposed on them by this Act, or by any Licence, Order, or Special Act, without the consent of the Board of Trade.

First of all, the Board of Trade replied stating that contracts made under the section for execution of works for supply and energy, did not require the consent of the department. When the Council obtained the Order, application was made to the Local Government Board for sanction to borrow £17,160, which included £8000, the purchase-money for the undertaking, and a large sum, to be advanced under the terms of the contract, to the Company for the purposes of extensions, mains, &c. The Board sanctioned a loan of £14,000—comprising £5000, a portion of the purchase-money, payable on the execution of the agreement for capital purposes. The Board, however, expressly declined to sanction the £3000 balance until the conditions had been complied with. In March, 1906, these conditions appeared to have been complied with; and the £3000 became payable. Application was then again made to the Local Government Board, asking for their sanction to a further loan enabling the Council to pay it. In the meantime, however—in April, 1905—the Corporation of Sudbury had occasion to go into Court on an agreement (which, in certain particulars, resembled the Felixstowe agreement) with a Company working an undertaking leased to them by the Corporation; and the Court held that the agreement required the sanction of the Board of Trade under section 11 of the Act. The Local Government Board, in reply to the Felixstowe Council's application to borrow £3000, mentioned the Sudbury case, and evidently had considerable doubt as to whether Felixstowe was not governed by that result. Anyhow, the Board had not seen their way to sanction the loan. Since his first audit, the Clerk had made application to the Local Government Board, asking for permission to borrow in order to remove the difficulty; but the Board had not seen their way clear to give it. Therefore the only course open to him was to make a disallowance, and surcharge the amount, on the ground that it represented money spent without the authorization of the Board. He would enter the certificate accordingly, and set out his reasons. The Council would, no doubt, appeal to the Local Government Board, with a view to considering the legality of the decision he had come to, and to represent the facts as they appeared to the Council. It did not appear to

him that there had been any omission on the part of the Clerk or the Council to take the steps that should be taken.

One of the members of the Council (Mr. D. J. Cowles) pointed out that the payment was made under a threat from the Company of legal proceedings, and to avoid the heavy expense of going to law. Their position was a difficult one. They certainly owed the money to the Company under the agreement. Counsel's opinion was obtained, and the matter fully gone into. They were now in the position they had endeavoured to avoid, as they would have to obtain a Provisional Order, which would involve them in considerable expense. The Council took it that there was an implied sanction; and their object in paying the money was to save expense to the district.

The Auditor replied that he was aware that the writ was actually issued by the Company for the balance. The Court might, of course, not take the same view of the Felixstowe case as they did in the Sudbury case. The point, however, was that no sanction had been obtained for borrowing £3000. He agreed that the Council had no reason for supposing that the sanction would have been withheld.

COSTLY ELECTRIC LIGHTING AT BEXHILL.

A statement in a local paper to the effect that the Bexhill Town Council estimate the street lighting for the half year at £1611, led "A Disgusted Ratepayer" to write to the Editor and ask him to help the poor struggling body of which he is a member. The request was complied with in a leading article in the issue for the 27th ult., in which the writer effectually controverted a statement made in the "Municipal Journal," that the electric light undertaking of the Corporation showed a respectable net surplus after all charges had been met. This opinion was formed from a distant standpoint. The writer in the local paper looked at matters more closely; and he characterized the statement as "a flagrant perversion of fact." He declared that no profit was made last year, that none had ever been made, and, furthermore, that none is likely to be made so long as the undertaking is controlled by the Corporation. He proceeded to offer the following remarks: "The surplus mentioned by our contemporary is a paper surplus to cover a loss, and is still another illustration of the dishonest methods practised by almost all the corporations who indulge in municipal trading. Not only was there no real profit made at Bexhill, but, like all the corporation-owned electric light undertakings in Great Britain, a serious loss has been the result of each year's trading. It is of no use mincing matters. Bexhill has practised the common-place trick of covering trade losses by manipulating the charges for street lighting. If, for example, the loss in supplying current to private consumers is £500 per annum, this loss can be turned into a profit of £500 by the very simple process of adding £1000 annually to the proper charge for street lighting. This is an exact illustration of what has occurred in this borough. How long will the ratepayers at Bexhill and other places allow their corporations to throw dust in their eyes in this deceitful fashion? . . . Private consumers are supplied with current under cost, and the general body of the ratepayers, including users of gas, pay for the deficiency in that part of the rate which is allotted to street lighting. A few figures will easily demonstrate this fact. In 1899, the last year in which the borough was publicly lighted by gas, with a population of 10,500, street lighting cost approximately £800 per annum. In 1906, with a population of 14,600, or less than 50 per cent. increase, the estimated cost has advanced to the huge sum of £3100. These are incontrovertible figures, and the clearest evidence that the electric lighting accounts have been 'cooked.' Honestly apportioned, it is quite impossible that the street lighting could have increased by 400 per cent. in seven years; and it is just as obvious that the public have been mulct to make up for the deficiencies of the trading with private consumers. No wonder the average ratepayer is slowly realizing that it is high time the Corporation disposed of their unprofitable undertaking to a private company, and the borough had the chance of reverting to the older, cheaper, and better illuminant—gas. Gas instead of electricity in the streets of Bexhill would mean more light, and a saving of little short of £2000 per annum, or 5d. in the rates."

The Lighting of Baildon.

Complaints having been made by the Baildon Urban District Council with regard to the quality and pressure of the gas supplied to them by Shipley, the matter was investigated, with the result that the pressure was found to be quite satisfactory, while the quality was naturally the same as that supplied to Shipley. In reporting on the subject to their own Council, the Shipley Gas and Electricity Committee pointed out that while the Council were called upon by statute to supply gas of not less than 14-candle power, the actual candle power of the gas supplied was over 17 candles. They added that, the Baildon Council having asked upon what terms gas would be supplied in case the Baildon lamps were fitted with incandescent mantles, a reply had been given that it would be supplied at the usual price of 2s. 6d. per 1000 cubic feet. When the question came before the Council, it was suggested by Mr. Shaw, who moved the adoption of the Committee's minutes, that an explanation of the poor lighting of the Baildon streets was probably to be found in the fact that the lamp-standards were fixed at much greater distances apart than in Shipley. At Baildon, the distances were from 180 yards to nearly 200 yards; while in Shipley they were from 60 to 80 yards.

Something like a Difference.—The Surveyor has submitted to the Swansea Streets Committee a comparative statement of the cost of gas and electricity for street lighting on the tramway routes. By means of this, he shows that gas would cost £349 11s. and electricity £960. In view of this, one of the members remarked that, though they would like electricity very much, they could not afford it; but seemingly the Committee could not, even in face of such figures, come to an immediate decision, for consideration of the question was adjourned.

METROPOLITAN WATER BOARD.

A Unification of Rates Bill to be Drafted.

A Special Meeting of the Board was held on Friday, to further consider the proposals of the Appeal and Assessment Committee and the Finance Committee in regard to the unification of the charges for water, as contained in their reports noticed last week (p. 335). The Assessment Committee recommended that the charge for domestic purposes should be one rate in the pound assessed uniformly on the rateable value of all properties. To this an amendment had been proposed, that the recommendation be referred back to the Committee with instructions to consider and report as to whether a graduated scale could not be framed that would be equitable in its incidence, and provide an adequate income. This amendment received the support of nine members. A further amendment, moved by Lord Welby, the Chairman of the Finance Committee, was that the domestic rate should be graduated according to value; but it was also lost. Sir T. Vezey Strong moved that consideration of the matter be deferred until the Committee brought up a report containing recommendations as to the manner in which it was proposed to charge for water supplied to premises not primarily intended for residential purposes, such as shops, countinghouses, warehouses, and so on. In the City, he said, the average charge for water now was only 3 per cent.; and if the Board imposed a charge of 5 per cent., it would mean an extra annual charge of £100,000 upon the ratepayers, who already paid out of all proportion to the water they consumed. This amendment was likewise lost; and the Committee's recommendation was agreed to. It was decided that the maximum charge to be authorized for water used for domestic purposes, including high service, baths, &c., should be 5 per cent., and that the charge for water supplied for purposes other than domestic should be one not exceeding 1s. per 1000 gallons. The proposals were referred to the Law and Parliamentary Committee, with instructions to draft a Unification of Rates Bill for the consideration of the Board.

BIRMINGHAM AND THE COVENTRY WATER SUPPLY.

Both the Birmingham and the Coventry City Councils have now confirmed the provisional arrangement entered into for a supply of water to the latter to be furnished from the water-works of the former at Whitacre.

A special meeting of the Birmingham City Council was held on Tuesday last, when the agreement was unanimously confirmed, subject to such modifications as the Water Committee might approve. In moving the resolution to this effect, Alderman Lawley Parker explained that the Whitacre Water-Works were constructed to deal with the Rivers Bourne and Blyth as sources of supply to Birmingham; and some years ago, with the view of postponing as long as possible the laying of further pipes to the Welsh aqueduct, it was decided to retain certain of the old sources of supply where the quality of the water justified it. In cases where there was not that justification, including the River Blyth, the sources were discarded when the Welsh water came into supply. The River Bourne, however, was retained as a stand-by; and experience had proved that the water was, and under proper supervision was likely to continue to be, well suited for domestic and other purposes, and superior to the blend when the Bourne and the Blyth were used. The Committee had looked closely into the question as to how much of the supply could be spared; and they had come to the conclusion that Coventry could be supplied with water up to a maximum of 2 million gallons a day without prejudice to Birmingham's requirements. The stand-by sources of supply had been considered capable of yielding 12½ million gallons a day; and it was computed that this quantity could be maintained for a period of sixty days, even when the demand for Coventry reached the maximum. It followed that for the remaining ten months of the year the stand-by would not be used for Birmingham, unless a short interruption of the Welsh supply should occur, as was the case in August last, when it was thought prudent to turn on the stand-by for a week to guard against the Frankley reservoir being drawn down too low while the aqueduct was being repaired. This very exceptional demand, however, made so little inroad on the reservoir that it might be disregarded. The Committee had made a careful calculation as to the cost, and had stipulated that the price paid by Coventry should be 4d. per 1000 gallons for the Whitacre water, with a minimum charge of £1250 a quarter, or £5000 a year. This price would cover all pumping charges, and a reasonable contribution towards the charges on capital account. The works at Whitacre had been kept up to make them an effective stand-by; and it was evident they would be more effective if they were maintained in actual work. They engaged that, in the event of the water failing to reach a standard of purity reasonably required by Coventry, the latter should be at liberty to terminate the agreement, or, in the alternative, should have the option of calling upon Birmingham to supply Welsh water at a price to be settled by agreement or arbitration. This price would, of course, necessarily be higher than would be charged for the supply from the Whitacre pumping-station; and the water would be delivered to Coventry through the mains which would be laid from Whitacre. The term of the arrangement was a period of forty years, or such time as Coventry might obtain for the repayment of the loan to provide the main, whichever was the longer. The Committee thought this was a reasonable term, having regard to Coventry's capital outlay.

As was briefly recorded in last Tuesday's "JOURNAL," the Coventry City Council held a special meeting on the preceding day (Monday); and a motion was then carried, with two dissentients, authorizing the Water Committee to give the requisite notices, and take all other steps to enable the Council to make application to Parliament next session for the borrowing and other powers necessary to carry into effect the arrangement with the Birmingham Corporation. Power will be sought in connection with the Bill for the Corporation to borrow the sum of £75,000 to cover the cost of new mains, &c., which it is estimated will

be required in the city during the next sixty years. The Council discussed the proposals in private for over two hours; and when the meeting became public, Alderman Bird formally moved the adoption of the resolution referred to, as well as that it be an instruction to the Committee to endeavour to obtain a clause in the Bill empowering Birmingham to give, and Coventry to take, at any time a supply of Welsh water on terms as to price and other conditions to be mutually agreed upon.

MONMOUTHSHIRE WATER AREAS.

A Big Scheme Proposed.

On Monday of last week, at Newport, a conference took place of representatives of the Monmouthshire County Council and other local governing bodies, for the purpose of considering a comprehensive scheme for supplying the county with water.

Mr. Baldwin Latham, who had been called in to advise the authorities, proposed that they should impound the waters of the Grwyne Fawr, a stream which joins the Usk at Llangrwyne, by making three dams, which, upon completion, will provide a storage capacity of about 800 million gallons; while there would be a daily supply of water available, after giving compensation water, of 4 million gallons. The total cost will be £730,000; but the scheme may be carried out in three sections—the first costing £200,000 for a daily supply of 1 million gallons, the second £250,000 for an additional daily supply of 1½ million gallons, and the third £280,000 for a daily supply of 1½ million gallons. Mr. Latham in his report states that practically all the sources of water available for supplying the higher portions of the county have been already secured, and proceeds to show that the water from the Severn Tunnel is not good enough for domestic purposes. He estimates that, if the same ratio of increase as in the past is maintained in the future, there will be a population of 500,000 in the county in sixty years' time. Dealing with the cost, he points out that if the initial £200,000 expended on the first reservoir was borrowed at 3⅞ per cent. for repayment in sixty years, a rate of 1·85d. on the county would pay the capital cost. There was every probability of the works paying from the first, having regard to the quality and the cheapness of the supply. The River Grwyne is located partly in Breconshire and partly in the county of Monmouth, and forms to a great extent, after leaving Breconshire, the county boundary between Brecon and Monmouth. The upper part of the valley through which it runs is absolutely devoid of population, and the stream is of sufficient capacity to provide for the present and future requirements of all Monmouthshire. The water is said to be so pure as not to need filtering; and the reservoirs will be situated at such a height as to supply all parts of the county by gravitation.

The conference was presided over by Alderman P. Wilson Raffan, who, in placing the matter before the meeting, sought to correct some misconceptions with regard to the scheme. It was, he said, stated by some critics that the scheme would have been an admirable one if it had been brought up twenty years ago. But he would remind them that the County Council had no power to promote a Bill of the kind in Parliament until three years ago. With regard to another contention, that they could earmark certain areas, he pointed out that Mr. Balfour Browne had assured them that Parliament would not give them power to earmark any particular district. They would be bound to outline some definite scheme such as this. The proposal outlined by Mr. Baldwin Latham was an admirable one, and provided not only for their immediate needs, but for succeeding generations. Dealing with the financial aspect, he denied that the scheme would mean a 2d. rate on the county. Arrangements would be come to whereby repayments would not be made until five years after the commencement of the construction of the works—until the scheme became remunerative. In 1908, when the first section of the scheme would be taken in hand, a halfpenny rate would suffice; in the next year a penny rate; and afterwards the rate would be increased to a maximum of 1½d. In 1911, they would be in a position to supply water; and the average cost for the whole of the first six years would represent only a halfpenny rate. After that period, they would have a surplus, and the scheme would be self-supporting. In conclusion, he urged upon the meeting the importance of conserving the present water area for the county.

Some discussion followed, in the course of which Colonel Curre, of Chepstow, remarked that his Council were of opinion that the rural districts should not be brought in. Mr. Price, of Tredegar, and Mr. Morgan, of Ebbw Vale, while sympathizing with the principle of the scheme, pointed out that it would be a great hardship on districts like Tredegar and Ebbw Vale, which had expended a great sum of money on a water supply, to be again asked to contribute towards another scheme. For instance, the rates at Tredegar were 8s. in the pound; and there was a fear of an increase if they joined the Western Valleys Sewerage Board. A number of representatives then spoke in support of the proposal; but Alderman Harris said the scheme was weak, in that it saddled those already overburdened and did not tax the people who would chiefly benefit. Others, again, favoured a waiting policy.

It was decided to adjourn the conference for three weeks.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Mr. Alfred Richards offered for sale, by order of the Directors, new issues of shares and stock on the Grays and Chichester Gas Companies. A parcel of 500 £10 "B" shares in the first-named Company, ranking for a maximum dividend of 7 per cent., and carrying £5 12s. per cent. as from the 15th inst., were sold at from £10 to £10 10s. each. The new issue by the Chichester Gas Company consisted of £5000 of "C" stock (7 per cent.), which fetched £124 to £125 per £100. On the same occasion, Mr. Richards sold some consolidated stock of the Hornsey Gas Company, carrying a dividend at the rate of 9⅛ per cent. per annum, at £200 per £100. In the evening, Mr. W. E. R. Randall sold, at the Auction Mart, Chatham, 500 ordinary £5 shares (maximum dividend 7 per cent.) in the Rochester, &c., Water Company, at from £9 2s. to £9 4s. each; also five "A" shares (10 per cent.) at £13 15s. and £13 17s. 6d. each. Tenders for the issue of 2180 £10 preference shares (6 per cent.) in the Bournemouth Gas and Water Company were opened on Thursday. The minimum price of issue was £14; and the whole of the shares were allotted at an average price of £14 12s. 8d. each. The applications amounted to about twice the number of shares offered.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 372.

Issue.	Share	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 12	10½	Alliance & Dublin 10 p.c.	20–21	..	5 0 0
245,112	10	,,	7½	Do. 7 p.c.	14–15	..	5 0 0
200,000	5	May 11	7	Bombay, Ltd.. . . .	6¾–7¼	..	4 16 7
40,000	5	,,	7	Do. New, £4 paid	5¼–5¾	..	4 17 5
50,000	10	Aug. 30	14	Bournemouth Gas and Water } 10 p.c. .	28–29	..	4 16 7
51,810	10	,,	7	} B 7 p.c. .	17–17½	..	4 0 0
53,200	10	,,	6	} Pref. 6 p.c.	14½–15½	..	3 17 5
380,000	Stk.	Aug. 15	12½	Brentford Consolidated	260–265	..	4 14 4
300,000	,,	,,	9⅜	Do. New . . .	198–203	..	4 13 7
50,000	,,	,,	5	Do. 5 p.c. Pref. .	120–125	..	4 0 0
206,250	,,	June 14	4	Do. 4 p.c. Deb. .	103–106	..	3 15 6
220,000	Stk.	Sept. 27	11½	Brighton & Hove Orig.	230–235	..	4 15 8
246,320	,,	,,	8½	Do. A. Ord. Stk. .	163–168	..	4 18 3
400,000	20	Sept. 27	10	British	40½–41½	..	4 16 5
104,000	Stk.	Aug. 15	6	Bromley, Ord. 5 p.c. .	120–124	..	4 16 9
165,700	,,	,,	4⅜	Do. do. 3½ p.c. .	90–93	..	4 16 9
500,000	10	Oct. 12	7	Buenos Ayres (New) Ltd.	11⅜–12½	..	5 14 3
250,000	Stk.	June 28	4	Do. 4 p.c. Deb. .	96–98	..	4 1 8
150,000	20	July 12	8½	Cagliari, Ltd.	24–26	..	6 6 11
100,000	10	Sept. 27	10	Cape Town & Dis., Ltd.	14–15	..	6 13 4
100,000	10	Oct. 26	4½	Do. 4½ p.c Pref.. .	9½–10*	..	4 10 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	50–52*	+1	5 15 5
50,000	Stk.	June 28	4½	Do. 4½ p.c. Deb. Stk	98–100	..	4 10 0
157,150	Stk.	Aug. 15	5	Chester 5 p.c. Ord. . .	108½–110½	..	4 10 6
1,443,280	Stk	Aug. 30	5⅜	Commercial 4 p.c Stk. .	110–113	..	4 12 0
560,000	,,	,,	5	Do. 3½ p.c. do. .	108–111	..	4 10 1
475,000	,,	June 14	3	Do. 3 p.c. Deb. Stk.	84–86	..	3 9 9
800,000	Stk.	,,	6½	Continental Union, Ltd.	123–126	+2	5 3 2
200,000	,,	,,	7	Do. 7 p c. Pref.	140–145	..	4 16 7
432,070	Stk.	Aug.	5½	Derby Con. Stk. . . .	122–124	..	4 8 9
55,000	,,	July	4	Do. Deb. Stk. . . .	105–107	..	3 14 9
486,690	10	July 27	11	European, Ltd. . . .	24–25	..	4 8 0
354,060	10	,,	11	Do. £7 10s. paid	18–19	..	4 6 10
15,203,110	Stk.	Aug. 15	4⅘	Gas- } 4 p.c. Ord. . .	97–99	+1	4 8 11
2,600,000	,,	,,	3½	light } 3½ p.c. max. .	87–89	..	3 18 8
3,709,735	,,	,,	4	and } 4 p.c. Con. Pref.	105–108	..	3 14 1
4,193,975	,,	June 14	3	Coke } 3 p.c. Con. Deb.	84–86	..	3 9 9
258,740	Stk.	Sept. 13	5	Hastings & St. L. 3½ p.c.	98–103	..	4 17 1
£2,500	,,	,,	6½	Do. do. 5 p.c.	118–121	..	5 7 5
70,000	10	Oct. 12	11	Hongkong & China, Ltd.	19¼–20⅛	..	5 7 4
940,000	Stk.	May 11	8	Imperial Continental .	185–188	..	4 5 1
473,600	Stk.	Aug. 15	3½	Do. 3½ p.c. Deb. Red.	95–97	..	3 12 2
181,242	Stk.	Aug. 30	6	Lea Bridge Ord. 5 p.c. .	120–125	..	4 16 0
306,083	,,	June 28	4	L'rpool Unit'd Deb. Stk.	109–111	+2	3 12 1
561,000	Stk.	Aug. 30	10	Liverpool United A . .	230–232	-¼	4 6 2
718,100	,,	,,	7	Do. B . .	169–170	..	4 2 4
144,140	Stk.	Sept. 13	7⅜	Maidstone 5 p.c. . .	145–1 0	..	5 1 8
75,000	5	June 28	5	Malta & Mean., Ltd. .	4¼–4⅜	..	5 5 3
560,000	100	Oct. 1	5	Met. of } 5 p.c. Deb..	101–103	..	4 17 1
250,000	100	,,	4½	Melbourne } 4½ p.c. Deb.	100–102	..	4 8 3
541,920	20	May 31	3½	Monte Video, Ltd, . .	11½–12½	..	5 12 0
1,675,892	Stk.	Aug. 15	4⅝	Newc'tle & G'tesh'd Con.	111–112	..	4 2 7
406,625	Stk.	June 29	3½	Do. 3½ p.c. Deb.	98–100	..	3 10 0
15,000	10	Aug. 30	10	North Middlesex 10 p.c.	20–21	..	4 15 3
55,940	10	,,	7	Do. 7 p.c.	13½–14½	..	4 16 7
300,000	Stk.	May 11	8	Oriental, Ltd. . . .	152–155	..	5 3 3
60,000	5	Sept. 13	7	Ottoman, Ltd. . . .	5⅝–6⅛	..	5 12 0
398,490	5	Oct. 26	7	Primitiva Ord. . . .	7¾–8⅛*	+⅛	4 4 10
796,980	5	July 27	5	Do. 5 p.c. Pref. .	5–5½	..	4 15 3
488,900	100	June 1	4	Do. 4 p.c. Deb. .	97–99	..	4 0 10
851,070	10	Oct. 12	7	River Plate Ord. . . .	12¼–12¾	..	5 7 8
300,000	Stk.	June 28	4	Do. 4 p.c. Deb. .	96–98	..	4 1 8
250,000	10	Sept. 27	8	San Paulo, Ltd. . . .	13½–14	..	5 14 4
70,000	50	July 2	5	Do. 5 p.c. Deb. .	49–51	..	4 18 0
135,000	Stk.	Sept. 13	10	Sheffield A	244–246	..	4 1 4
209,984	,,	,,	10	Do. B	244–246	..	4 1 4
523,500	,,	,,	10	Do. C	244–246	..	4 1 4
70,000	10	Oct. 26	10	South African	15½–16½*	..	6 1 3
6,350,000	Stk.	Aug. 15	5½	South Met., 4 p.c. Ord.	129–131	+1	4 4 0
1,895,445	,,	July 12	5	Do. 3 p.c. Deb.	85–87	..	3 9 0
201,220	Stk.	Sept. 13	8	South Shields Con. Stk.	136–138	..	5 1 3
575,000	Stk.	Aug. 15	5½	S'th Suburb'n Ord. 5 p.c	123–126	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref. .	123–126	..	3 19 4
112,533	,,	July 12	5	Do. 5 p.c. Deb. Stk.	128–133	..	3 15 2
502,310	Stk.	May 11	5	Southampton Ord. . .	107–112	..	4 9 3
120,000	Stk.	Aug. 30	6¾	Tottenham } A 5 p.c. .	127–130	..	5 0 0
388,020	,,	,,	5	and } B 3½ p.c. .	104–106	..	4 14 4
137,500	,,	June 28	4	Edmonton } 4 p.c. Deb.	103–105	..	3 16 2
182,380	10	June 14	8	Tuscan, Ltd.	10½–11	..	7 5 6
149,900	10	July 2	5	Do. 5 p.c. Deb. Red.	104–106	..	4 14 4
193,742	Stk.	Sept. 13	5	Tynemouth 5 p.c. max.	105–107	..	4 13 6
30,000	Stk.	Aug. 15	8	Wands- } A 5 p.c. . .	—	..	—
255,636	,,	,,	6½	worth } B 3½ p.c. . .	138–143	+1	4 10 11
75,000	,,	,,	5⅝	and } C 3½ p.c. . .	113–115	..	4 17 5
79,416	,,	June 28	3	Putney } 3 p.c. Deb. Stk	82–85	..	3 10 7
779,875	,,	Aug. 15	5½	West Ham 5 p.c. Ord.	104–106	..	4 16 6
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	120–123	..	4 1 4
193,300	,,	June 28	4	Do. 4 p.c. Deb. Stk.	103–106	..	3 15 6

Prices marked * are "Ex div.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

At the meeting of the Edinburgh and Leith Gas Commissioners on Monday, it was reported that the valuation of the undertaking for the current year had been fixed at £86,840—which is a decrease of £8240 upon the valuation last year. The Clerk was instructed to write to the Town Clerks of Edinburgh and Leith, and the Clerk to the Midlothian County Council, asking for copies of the reports recently received by these Corporations from their sanitary advisers as to smells said to emanate from the Granton Gas-Works.

The Council of the Cockburn Association—a body whose sole duty is to look after the amenity of the City of Edinburgh—wrote to the Commissioners asking if the chimney at the old gas-works in Edinburgh would now be removed, seeing that the works were disused. Lord Provost Sir Robert Cranston suggested that they should reply that the chimney would be removed before long. Judge Bryson, the Convener of the Works Committee, however, reminded the Commissioners that his Committee some months ago decided that the chimney might be useful to anyone buying the works. It was consequently agreed to reply that the matter was under consideration until the works were sold.

As this was the last meeting of the Commissioners to be attended by Sir Robert Cranston, Provost Mackie, of Leith, proposed a vote of thanks to him for his conduct in the chair, and to Sir Andrew M'Donald, who was elected to the Commission in 1894, and who was also now about to leave them. Both gentlemen returned thanks to the Commissioners; the Lord Provost adding that he desired to thank the officials of the Commission for their kindness to him.

At a meeting of the Town Council of Edinburgh on Tuesday, Treasurer Brown drew attention to the bad quality of the gas at present, and said the illuminating power was below 20 candles. The Town Clerk was instructed to write to the Gas Commissioners and ask for an explanation. Whatever may be said of Treasurer Brown, who is not a Gas Commissioner, of Lord Provost Cranston it may be pointed out that so late as June 25 last, at a meeting of the Gas Commissioners over which his Lordship presided, authority was given to reduce the illuminating power of the gas to 20 candles, which is the minimum allowed by statute; and his Lordship might have observed, from official documents, that since June the average illuminating power of the gas has not been reported to the Gas Commissioners. I do not know where the notion is got that the consent of the Town Council is required to a reduction of the illuminating power. All the authority which the Town Council may have in this matter cannot be more than the power to make an agreement, when negotiating for a supply of gas for the public lamps, that it shall be of a specified illuminating power. That gas is being supplied below 20-candle power is a statement I do not accept further than this, that it is possible to make the gas of less than 20 candles by the method of burning it.

The Oil Gas Enrichment Company, Limited [the annual report of which is given upon another page], is within measurable distance of its demise. A year hence it will be out of existence; the patents which it was originated to protect having expired. Doubtless it would be possible to carry the Company on, were any good purpose to be served; but the trend of opinion is against enrichment, and so the Company will have to be dropped. Whatever be its fate, it must be allowed that the invention was a beautiful one, and was most valuable from a scientific point of view; and it is just possible, though the Company will not have any benefit by it, that in days to come scientists may find the process useful in exceptional circumstances, such as the production of a very high-grade gas for special purposes. It is to be regretted that the Company has never been commercially the success which the invention deserved. But that was a circumstance over which neither the Directors nor anyone else had control; and the inevitable has had to be bowed to.

This is the season of municipal activity in the matter of elections. There is nothing being put forward, so far as I can see, of much interest to us. I observe, however, that at a meeting of ratepayers at Dalkeith on Thursday evening, Provost Handyside said that this was the first year they had had the accounts for the electric lighting of the streets, and it was found that the cost amounted to about double what it was when gas was the illuminant.

In an article in the "Aberdeen Free Press" on Thursday, upon the public debt of the city, it is brought out that the total is over two millions sterling, which is considered to be a heavy burden for the community to bear. In the detailed list of accounts, it is significant to observe that while the capital account of the Gas Department is stated at £205,456, of which £124,120 is the capitalized value of annuities, and £81,535 borrowed money, the capital account of the Electricity Department amounts to £211,035. In considering these figures, it has to be borne in mind that the Gas Department is by far the larger of the two, alike in the area which it serves and in the number of consumers on the books.

The Aberdeen Town Council on Thursday dealt with two subjects relating to the water supply of the city. In the first the Water Committee reported that they had considered the proposal to erect filter-beds at Invercannie, where the water is taken from the River Dee; that the cost was estimated at £83,000; and that the Committee did not feel warranted in recommending the Council to incur so large an expenditure until the Council should have come to a decision as to the source of a new water supply, but that they recommended that there should be weekly bacteriological and chemical examinations of the water during the next twelve months. After a discussion, the subject was, on the suggestion of Lord Provost Sir Alex. Lyon, allowed to stand over, to be dealt with by the reconstituted Town Council. The other subject was a proposal to remit to the Water Committee to consider the propriety of forming a separate department to take charge of the water-works. This proposal was discussed with some acrimony, as it was looked upon as a reflection on the Burgh Surveyor's Department,

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which at present manages the water undertaking. The remit was, however, made unanimously.

An additional water supply for Irvine and district was turned on last Wednesday by Provost Blakely, of Saltcoats. There is a Joint Board in charge of the water supply to Irvine, Kilwinning, Stevenston, Saltcoats, and Nobel's Dynamite Works; while the burgh of Troon is applying for a supply. The population served is about 30,000. There is an existing reservoir at Munnoch; but sometimes it is barely equal to the supply of the district. A new reservoir has been constructed upon the Caaf stream, of a capacity of 190 million gallons; there being a surface area of 37 acres, and a greatest depth of 67 feet. The cost has been £40,000; and a further outlay of £8000 is being made upon the provision of additional filtering accommodation. The Engineers to the scheme have been Messrs. J. & A. Leslie and Reid, of Edinburgh; and the Contractors, Messrs. James Young, Limited, of Glasgow. After the water had been turned on, luncheon was served. In the course of the after proceedings, Mr. W. A. Tait, of the Engineers' firm, presented Provost Blakely with a silver rose bowl on stand; and Provost Borland, of Irvine, presented, on behalf of the Water Board, a clock and ornaments to Bailie Miller, of Saltcoats, who has been Convener of the Works Committee.

CURRENT SALES OF GAS PRODUCTS.

Week ending Nov. 3.

LIVERPOOL, *Nov.* 3.

Sulphate of Ammonia.

With the completion of the covering of October contracts, the market assumed a quieter tone, and there has been no further advance in prices, except in Scotland, where there are large requirements for prompt delivery and only moderate available supplies. The closing quotations are consequently £12 3s. 9d. per ton f.o.b. Hull, £12 7s. 6d. per ton f.o.b. Liverpool, and £12 10s. per ton f.o.b. Leith. There has been good inquiry for November-December delivery, and £12 10s. per ton is now quoted in this position. January-April delivery is still in request in Scotland, and, makers being now rather fully sold, £12 15s. per ton f.o.b. Leith is quoted, though there are still sellers of April-September at £12 10s. per ton.

Nitrate of Soda.

This article is quiet in all positions, and spot quotations are 11s. 7½d. and 12s. 3d. per cwt. for 95 per cent. and refined qualities.

LONDON, *Nov.* 3.

Tar Products.

The market for tar products has remained firm throughout the past week, with the exception of pitch, which is still rather slow of sale. Dealers are reported to be willing to accept less than 30s. per ton for London pitch for prompt delivery. As regards the east coast, business has been done at 27s. for prompt delivery; while manufacturers are willing to sell at 28s. for delivery from now to the end of June next, provided some quantity is taken during the present year. In Liverpool, business is again reported at 28s. for this year's delivery. There is an absence of demand from the Continent and South Wales; and this will probably not right itself until further fuel contracts have been settled. The demand for creosote continues to be well maintained. London manufacturers are still unable to quote for prompt delivery; while for forward they do not care to come into the market at present. Second-hand oil is, however, reported to have been sold at prices varying from 2d. to 2 1/16d. per gallon. In the Midlands, manufacturers are very well sold, and do not appear disposed to consider anything under 2d. for next year's delivery. In the North, the distillers are evidently determined to hold whatever quantities they have available just now. Continental consumers appear to have covered their urgent needs for carbolic acid for immediate delivery, and will not now offer more than 1s. 9d. all round; while for next year's delivery, they, in most cases, refuse to pay more than 1s. 8½d. The position in crystals remains entirely unchanged. There has not been much business in toluol; but some quantity was sold for prompt delivery in the Midlands at a very good price. There is a particularly good demand for benzol for prompt delivery in London, for which over 11d. is reported to have been paid. In the North, business has been done at 10½d. and 10¾d. for delivery over the first six months of next year for export. In 50-90 per cent. benzol, the market remains very firm; and good prices are reported to have been paid on the east coast for delivery over the first six months of next year. Solvent naphtha is firm. London manufacturers are asking 1s. 3d. per gallon for delivery all over next year; while business is reported to have been done in the North at 1s. 2d. over the same period. There is no business whatever doing in anthracene.

The average values during the week were: Tar, 16s. to 20s. Pitch, London, 29s. to 30s.; east coast, 27s. to 28s.; west coast, 27s. to 28s. Benzol, 90 per cent., 11d. to 11⅛d.; 50-90 per cent., 11⅜d. to 1s. Toluol, 1s. 1½d. to 1s. 2d. Crude naphtha, 4¾d. to 5d.; solvent naphtha, 1s. 2d. to 1s. 3d.; heavy naphtha, 1s. 2d. to 1s. 4d. Creosote, London, 2 1/16d. to 2½d.; North, 1 11/16d. to 1 13/16d. Heavy oils, 2½d. Carbolic acid, 60 per cent., 1s. 9½d. Naphthalene, £5 to £8 10s.; salts, 30s. to 32s. 6d. Anthracene, "A" quality, 1½d.

Sulphate of Ammonia.

The market has been quiet during the past week, with practically no alteration in prices and comparatively little business doing. The principal Gas Companies ask £12 11s. 3d. for November-December delivery, and £12 15s. for January-April; but ordinary makes could probably be secured at about £12 5s. for November delivery upon their terms. In Leith, there has not been any business doing. Makers ask £12 10s.; but dealers refuse to offer anything over £12 7s. 6d. at present. In Liverpool, business is reported to have been done in the best makes at equal to £12 7s. 6d.; while £12 5s. is about the price for ordinary qualities. In Hull, no business of importance has been done; and the market remains at £12 5s. to £12 7s. 6d., according to quality.

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	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
Blackburn	1,250,000	Winnipeg, Man.	500,000	Malton	150,000
Windsor St. Works, Birmingham	2,000,000	Colchester (Second Contract)	300,000	Smethwick	500,000
Saltley Works, Birmingham	2,000,000	York	750,000	Gravesend	300,000
Colchester	300,000	Rochester	500,000	Pernambuco, Brazil	125,000
Birkenhead	2,250,000	Kingston, Ont.	300,000	Duluth, (Second Contract)	300,000
Devizes	120,000	Crystal Palace District	2,000,000	Leicester (Second Contract)	1,000,000
Saltley, Birmingham (Second Contract)	2,000,000	Duluth, Minn.	300,000	Newport (Second Contract)	250,000
Windsor St., Birmingham (Second Contract)	2,000,000	Caterham	150,000	Brockville	250,000
Halifax	1,000,000	Leicester	2,000,000	Toronto (Third Contract)	750,000
Toronto	250,000	Enschede, Holland	150,000	Montreal, Ont. (Second Con.)	1,800,000
Ottawa	250,000	Buenos Ayres (River Plate Co.)	700,000	Toronto (Fourth Contract)	1,000,000
Lindsay (Remodelled)	125,000	Burnley	1,500,000	Hamilton, Ont.	400,000
Montreal	500,000	Kingston-on-Thames	1,750,000	Rochester (Third Contract)	1,600,000
Toronto (2nd Cont., Remodelled)	2,000,000	Accrington	500,000	Leeds (Second Contract)	900,000
Belleville	250,000	Tonbridge	300,000	Buenos Ayres (Primitiva Co.)	1,200,000
Ottawa (Second Contract)	250,000	Stretford	500,000	Buenos Ayres (New Co.)	1,200,000
Brantford (Remodelled)	200,000	Oldbury	300,000	Christchurch, N.Z.	300,000
St. Catherines (Remodelled)	250,000	Todmorden	500,000	Rochdale	1,600,000
Kingston, Pa.	125,000	Saltley, Birmingham (Third Contract)	2,000,000	St. John's, Newfoundland	250,000
Peterborough, Ont.	250,000	York (Second Contract)	750,000	Brantford (Second Contract)	400,000
Wilkesbarre, Pa.	750,000	Rochester (Second Contract)	500,000	Smethwick (Second Contract)	500,000
St. Catherines (Second Cont.)	250,000	Newport (Mon.)	250,000	Pontypridd	250,000
Buffalo, N.Y.	2,000,000	Tokio, Japan	1,000,000	Montreal (Third Contract)	1,800,000
		Newcastle-on-Tyne	1,800,000	Guelph, Ont.	50,000
		Leeds	1,800,000	Buenos Ayres (River Plate Co.) Second Contract	750,000
				Belgrano (River Plate Co.)	500,000

And, in addition, COAL GAS PLANTS at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

COAL TRADE REPORTS.

Lancashire Coal Trade.

There is no change to report in the general condition of the county coal trade. Supplies of all kinds of fuel, except the best sorts of slack, are to be had in abundance. Prices remain firm at our last quotations. It is not improbable, however, that the charges for good slack will be advanced. Slack of inferior quality is plentiful, and can be had at low rates. The demand for steam and forge coal is very strong. Gas coal and cannel are being used in steadily increasing quantities. House coal finds a more ready market. The wages question and the reformation of the Coal Conciliation Board are still in abeyance. It is felt here, however, even by the coal proprietors, that, under existing circumstances, wages of miners will be increased in a short time—probably at the beginning of the New Year.

Northern Coal Trade.

The change in the coal trade has now come; and with the effluxion of the tax there has been a heavier export demand for many kinds of coal. The production is full; and it is well taken up. In the steam coal trade, this animation is not usual after the end of the Baltic season; and it will probably be short in duration. At present, best Northumbrian steams are 11s. 6d. to 11s. 9d. per ton f.o.b., second-class steams 10s. 6d., and steam, smalls (strong in demand and rather scarce) at about 7s. 6d. to 8s. 6d.; but in all these classes there are possible variations should labour troubles continue. In the gas coal trade, the deliveries on the long contracts are now very heavy; and the consumption is advancing to its fullest. Prices are very firm. For occasional cargoes, the price is from about 10s. to 11s. per ton f.o.b.; while for one or two of the very best Durham kinds, the quotation is up to 11s. 6d. There is not much to say as to contracts just now. Sales, however, are being made of gas coals for export, and that over a season, at prices that are near those we have quoted above. The reduction of the coal duty will be partly counterbalanced by the higher prices of gas coal. Coke is steady; and gas coke benefits—the price being from 12s. 6d to 13s. 9d. per ton f.o.b., according to quality and shipping place.

Scotch Coal Trade.

There is great activity in trade, especially in the Lothians, where there is an abnormal demand for shipping. The remission of the coal-tax led to the holding up of steamers last week till after the 1st inst., since when the statistics have again gone up. All sorts have been raised in price; the advance, in some instances, being about equal to the amount of the tax which has been taken off. The Conciliation Board met in Glasgow last week, and talked over the demand of the miners for an advance of 12½ per cent. in wages, but did not arrive at any resolution; the subject being continued for further inquiry. The prices quoted are: Ell 9s. 6d. to 10s. 9d. per ton f.o.b. Glasgow, splint 10s. 6d. to 10s. 9d., and steam 9s. 3d. to 9s. 6d. The shipments for the week amounted to 291,335 tons—an increase of 14,212 tons on the preceding week, and of 13,815 tons upon the same week of last year. For the year to date, the total shipments have been 11,432,483 tons—an increase upon the corresponding period of 1905 of 1,228,129 tons.

New Joint-Stock Companies.

The Star Incandescent Light Company, Limited, has been registered with a capital of £500, in £1 shares, to take over the business of manufacturers of, and dealers in, gas appliances, &c., carried on at 70, High Street, Borough, S.E. The Non-Carbonizing Inverted Gas Lighting Company, Limited, has a capital of £100, in £1 shares. The Economic Light Company, Limited (J. Mandel and Co.), has been formed with a capital of £2050, in 2000 ordinary shares of £1 each, and 1000 deferred shares of 1s. each, to adopt an agreement with J. Mandel and S. Salomon for the acquisition of the business of a dealer in incandescent gas mantles and fittings carried on by the former as the Economic Light Company (J. Mandel and Co.). The Direct Gas-Fuel Company, Limited, is a new Company with a capital of £1000, in £1 shares. The Glynhir (Steam, Gas, and House Coal) Collieries, Limited, has been registered with a capital of £50,000, in £5 shares (5000 non-cumulative preference shares of 7 per cent.), to adopt agreements (1) with Mr. F. G. Vivian, (2) between him and the Water-Works, Lighting, and Power Investment Corporation, Limited, and (3) with Mr. H. P. Davies. The first provides for the sale to the Company of agreements for the lease of certain coal mines in Glamorgan, reserving to Mr. Vivian the right to appoint a Director; the second provides for the equipment of these mines; and the third for the remuneration of Mr. Davies for services rendered and money expended. The Company will carry on the business of colliery proprietors, &c.

A Subsidence and a Gas Explosion.—At White Lee, Birstall, last week, a somewhat serious gas explosion occurred, by which one woman was so injured as to necessitate her removal to the hospital, while several cottages and their contents suffered extensive damage. It is stated that a new street-drain had just been put down to the cottages in question by the Birstall Urban District Council. The gas-main, which was above the sewer, had to be swung up; and after the work of laying the drain was completed, the main was replaced, and the soil filled in. Recent heavy rains, it is conjectured, caused the earth to subside; and a serious leakage of gas resulted. This gas percolated through the loose soil, and accumulated in a disused well, partly under the kitchen of one of the cottages, and partly under the wall. Then the gas worked through into the kitchen; and, coming in contact with the fire, the explosion occurred. All the four cottages originally had wells; but this fact was not known by the residents, as the wells had been covered up.

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Stockton and the Tees Valley Water Bill.—At a special meeting last Friday, the Stockton Corporation reconsidered their opposition to the Tees Valley Water Board Bill. Stockton is, of course, one of the three authorities who are interested in the Board; and representations were made by the Board that their proposed amendments would wreck the Bill. The object of the Stockton amendments was to make Teesside ironmasters pay, after 1914, the cost price of the water, which is estimated at 6d. per 1000 gallons, instead of 4d. in the boroughs and 4½d. outside, as provided in the Bill. After a long discussion, the Corporation resolved, by a majority of one, to maintain their opposition to the Bill.

Halifax Water for Batley.—The Halifax Town Council have decided to supply the Batley Corporation with water when the new reservoirs at Walshaw Dean are completed. The maximum supply per week is to be 3 million gallons, and the minimum supply 1 million gallons; the agreement to be for a period of 25 years. The price is to be 5½d. per 1000 gallons up to 1½ million gallons supplied per week, and 5d. per 1000 gallons for any quantity exceeding this. The Council have further agreed to deliver the water at Brighouse; Batley to lay pipes beyond this point. The Walshaw Dean reservoirs, which are expected to be completed next summer, will yield Halifax a daily supply of 2½ million gallons of water.

Cheap Gas Wanted at Newark.—The members of the Newark Urban District Council are of opinion that the charge of 2s. 8d. per 1000 cubic feet made by the Gas Company is "too high;" and one of the members, when the matter was under discussion, even asserted that in other towns of about the same size as Newark the price was 2s. 1d. or 2s. 2d. per 1000 feet. One member did venture to assert that the Company were acting within their rights; and he added that the Council should make an effort to purchase the undertaking, and then the bickering about the price of gas would be done away with. The upshot was that the Lighting Committee were authorized to deal with "the matter of the conduct of the gas undertaking."

Retford Water Supply.—In their annual report, the Retford Water Committee state that in the past year there was expended on capital account £60, principally upon extensions of mains and new services; and there is now over-expended on capital account the sum of £1433. The water-rates for the year were £2817, as compared with £2717 for the preceding twelve months—showing an increase of £100. The net profit for the year, after paying all interest and instalments on account of principal, is £483, as compared with £407, or an increase of £76. The amount now standing to the credit of the profit and loss account is £1050; and the Committee recommend that £1000 of this be transferred to the credit of the capital account, thus reducing the amount over-expended from £1433 to £433.

Embezzlement by a Water Collector.—A water-rate collector at Nottingham, named Arthur Douse, was last week sentenced to two months' imprisonment for embezzling various sums of money belonging to the Corporation. It was stated that the total defalcations amounted to £195, though the deficiency was more than covered by means of guarantee policies which were always taken out. Accused had been employed as collector for ten to twelve years. It was found the arrears for the past quarter were becoming rather heavy; and special collectors were deputed to make inquiries, with the result that the defalcations were discovered. The receipt books showed that the accused had given an official receipt for the money received, which he had detached from another counterfoil.

Lynn Water Supply.—A Local Government Board inquiry was held at Lynn last Wednesday, by Colonel A. J. Hepper, relative to the desire of the Borough Council for sanction to borrow £5000 for extensions and additions to the water-works at Gayton. The Town Clerk (Mr. J. W. Woolstencroft) explained that the money was required for the purpose of providing an additional well and engine at the present water-works. The reason for the application was that the Town Council felt that there was not a sufficient margin of safety. The present engines were originally put in in 1899, with the view of each one acting as a stand-by for the other. They had been knocked about a good deal; and from time to time there had been breakdowns. As a matter of fact, there was a stoppage of the water supply to the town on one occasion.

Oil Gas Enrichment Company, Limited.—At the meeting of this Company next Thursday, the Directors will report that the net profit for the year ending the 30th of September amounts to £270, being an increase of £67 on the preceding year. The balance at the credit of the profit and loss account is £1063, which the Directors recommend be disposed of in the payment of a dividend of 5 per cent. on the preference or "A" shares, which will amount to £250, and will leave £813 to be carried forward. The investments are stated in the balance-sheet at their original cost price of £6200; but their value on Sept. 30 last was £5371. The Company's principal patent expired on the 5th of July. The two subsidiary patents expire on June 23 and July 5, 1907, respectively; and the Company will then have to be wound up, and the assets divided among the shareholders according to their respective interests.

Street Lighting in Oxford.—In answer to a question in the Oxford City Council, Alderman Buckell, the Chairman of the Watch Committee, admitted that a large number of lamps had lately been unlighted at times when, under the agreement with the Gas Company, they should have been lighted. He said he believed that about 400 lamps had failed in a month. This was a much larger number than ever before, and was, he thought, due to a new clockwork method of lighting that had been introduced. The Town Clerk said that the attention of the Company was being called to the matter. There was no mention in the contract with the Company of any rebate for lamps which went out in this way. He gave it as his opinion that Oxford was admirably lighted by the incandescent lamps; and it was only because the Company had tried the new experiment, instead of keeping on with the old method of "going round and poking the lamps with a stick," that they had had this little friction. Personally, he considered that, spread over the month, the number of lamps unlit, and the hours they were out, was very small in comparison with the total number of lamps and the total number of hours they ought to be lighted.

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Management of the Abergavenny Gas-Works.

In the minutes which were submitted to the Abergavenny Town Council on Monday last week, the Gas Committee stated that, acting on legal advice, they had, on Oct. 3, ordered a letter to be sent to Mr. Hubert Russell, the Manager, containing the decision of the Council to discharge him (*ante*, p. 115), and informing him that he would be allowed, as an act of grace, the use of the house until the end of last month. A cheque was ordered to be drawn for the amount of salary due, *plus* one month's salary, also offered as an act of grace; and it was decided to advertise for a new Manager at a salary of £160 per annum, with use of house, coal, gas, and water. Subsequently, the Chairman of the Gas Committee (Mr. Deverall) reported to the Council that Mr. Russell had declined to accept the salary tendered to him on his discharge, or to give up the management of the works. The Council left it in the hands of their Solicitor to take such steps as he might think necessary to keep Mr. Russell away from the works. When the Council met last week, it was reported that 124 applications for the position of Manager had been received; and of these, twelve were selected and handed over to the Gas and Finance Committees for consideration. A writ has been served for wrongful dismissal and salary, by the Solicitor of Mr. Russell, on the legal representatives of the Corporation, who have been instructed to enter an appearance.

Continental Union Gas Company, Limited.—The Directors have decided to recommend, at the general meeting to be held on the 11th prox., dividends for the half year of 3½ per cent. on the ordinary stock, free of income-tax, and of a like amount on the preference stock, less tax; making 6½ per cent. in the former and 7 per cent. in the latter case for the year.

Gas Poisoning Case at Brighton.—A verdict of "Death from misadventure" was returned by a Jury who inquired into the death of a man named Thomas Whitehouse (aged 76) at Brighton. The deceased was found dead in his bedroom; and the doctor who was called in said that, in his opinion, Whitehouse, smelling an escape of gas, got out of bed, but fell back asphyxiated. He attributed death to suffocation from gas poisoning.

At a recent meeting of the Gas Committee of the Belfast Corporation, the tenders submitted for the supply of coal were considered, and among the four accepted was one by the Eveson Coal and Coke Company, Limited, for 15,000 tons.

The Carlisle Finance Committee have agreed to accept a loan of £100,000—£47,500 for water-works and £52,500 for sewage disposal purposes—from the Prudential Assurance Company, at 3⅜ per cent. interest, repayable by annual instalments of principal extending over the periods of repayment for which the loan is authorized, with interest on the current balance.

In "The Times" last week, a paragraph from the issue of Oct. 28, 1806, appeared: "A discovery is advertised as a mine of wealth, from the creation of light by the use of vapour. That many expensive projects for making fortunes have ended in smoke is well known; but if this succeed, it will be perhaps the first instance where a plan commencing in smoke has ended in money."

The South Metropolitan Gas Company, as owners of the steam-tug *Heathorn*, were awarded, in the City of London Court, a few days ago, the sum of £100 for rendering valuable aid in salving the sinking steamship *Kent* off Woolwich Arsenal in May last. The value of the *Kent*, her cargo, and freight, was upwards of £4000. The services rendered occupied only half-an-hour.

By an announcement which appears elsewhere, it will be seen that the North Sussex Gas and Water Company are about to issue at par £7500 of 6 per cent. preference stock (in multiples of £5); being part of the additional capital of £12,000 authorized by the Act obtained this session, which is noticed in an earlier part of the "JOURNAL." The issue was authorized at a meeting held on the 26th ult. (see *ante*, p. 343).

The Richmond Gas Stove and Meter Company, Limited, have sent us two neatly printed booklets—one (in artistic wrapper) showing their leading lines in gas fires and radiators; and the other giving particulars of their "Monarch" gas-steam radiator. This contains views of London buildings fitted with these appliances, the names of some people to whom they have been supplied, and extracts from testimonials received from gas managers who have had working experience of them.

The Barnet District Gas and Water Company are inviting, as will be seen from the announcement in our advertisement columns, tenders for £8125 of consolidated 4 per cent. preferential debenture stock; being a portion of the sum of £124,850 authorized to be borrowed under the Company's various Acts. The minimum price is fixed at par; and the purchase-money must be paid on or before the 27th prox. —the interest accruing from Jan. 1, 1907. No tender will be accepted for less than £25 of stock; and the latest time for the reception of tenders is noon on the 15th inst.

An inquiry was held last week by Mr. W. O. E. Meade-King, at Blagdon, with regard to an application from the Axbridge Rural District Council to borrow £5300 for the purpose of a water supply for the village of Blagdon. Mr. A. Powell, the Engineer for the scheme, said that the source was a spring on Mendip, about 850 feet above sea-level; and the supply was to be by gravitation. The lowest gauge recorded was in August this year, when 17,750 gallons in 24 hours were registered. There was to be a stand-pipe and house-to-house supply; and there were to be 18 stand-pipes. An accommodation tank was to be made, chiefly for the riparian owners, and also a storage reservoir. The reservoir would contain about 45,000 gallons—two days' supply, reckoning 20 gallons per head of the population. The water-level of the reservoir would be 555 feet above sea-level.

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HARROW AND STANMORE GAS COMPANY. Nov. 27.
HUNGERFORD GAS COMPANY. Nov. 13.
ILFORD GAS COMPANY. Nov. 13.
KINGSTON GAS COMPANY. Nov. 21.
NORTH SUSSEX GAS AND WATER COMPANY.
SOUTHEND GAS COMPANY. Nov. 20.
SOUTHEND WATER COMPANY. Nov. 13.
SOUTH ESSEX WATER COMPANY. Nov. 27.

Company Meeting.

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